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AND

ANNALS OF COMPARATIVE PATHOLOGY.

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# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### ORIGINAL COMMUNICATIONS AND CASES.

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*Have the Importations of Foreign Stock into England been beneficial to us as a Nation?*

THIS question—now seriously debated in most parts of the United Kingdom, and more especially amongst the breeding and grazing communities—presents to us rather a wide field for discussing a subject fraught with paramount importance, not only to the agricultural body, but likewise to the great consuming classes of the whole country. In its consideration, we find special interests involved, and those, too, of by no means a limited character, which, on the one hand, from the desire for protection from competition, contend that free trade in stock has been ruinous to them; and, on the other, that other than absolute freedom would have the effect of advancing the quotations far beyond those at present realised in our markets, and that, consequently, every encouragement should be given to the foreign producers to insure for us an increased quantity of food to meet the consuming powers of the people. It is not our intention, on the present occasion, to enter into a political discussion, bearing upon the value of free trade as a whole; but we consider it indispensably necessary that we should calmly and dispassionately—seeing the extent of the long-complained-of disease amongst both beasts and sheep, and the heavy losses which have been sustained during the present year (losses, be it observed, far more extensive than have been recorded in the public journals)—consider a few points in connection with the production and consumption of animal food. The leading points may be thus briefly summed up:—

1. Have we, as a nation, profited by the free introduction of foreign stock?

2. Have prices of either beasts or sheep suffered from foreign competition?

3. Have the losses of home-fed stock been equal to the importations?

4. Are the precautions taken to prevent the spread of disease in England and elsewhere judicious, and equal to the emergency?



*Lastly*, we propose to demonstrate the utter fallacy of the system which admits the intermixture of foreign stock with our own.

The first question, as given above, has never hitherto been raised; but, on close examination of various details, it will be found all-important both to the producing and consuming classes. The former naturally desire a remunerative price for their productions, whatever they may consist of; whilst the latter too frequently contend for the necessity of enlarged supplies, from whatever source they can be obtained, without fully comprehending the effects which may ultimately arise from the importation of an article, which carries with it a fearfully destructive power, and which may be instrumental in raising the value of a particular commodity far above its ordinary level—consequently, in sapping the very foundations of our agricultural greatness. London being the great emporium for the import and sale of foreign stock, claims our attention, in the first place, as the largest consuming city in the world, and as *the centre of disease*, which we shall prove as we proceed. The great increase in the population of the metropolis during the last ten years, viz., 440,798, the actual census in 1851 being 2,362,236, and in 1861, 2,803,034 souls, would naturally lead us to the conclusion that the necessities of the people would lead to an enormous increase in the consumption of butchers' meat, and the operations of free trade in foreign stock would materially assist in providing for the requirements of an augmented population. Let us bring a few statistical facts to bear upon this question. In doing so, we will take the past 11 years, viz., from the period of the census in 1851, and include the value of beasts and sheep in a given period. If we mistake not, the details will show that free trade in cattle has been otherwise than favourable to the country generally. In the 11 years, then, ending with 1861, the total supplies of stock exhibited in the London markets, were as under:—

TOTAL SUPPLIES OF STOCK EXHIBITED IN THE LONDON  
CATTLE MARKET.

Years.	Beasts.	Cows.	Sheep and Lambs.	Calves.	Pigs.
1851, ... ..	233,761	5,083	1,549,426	21,383	33,954
1852, ... ..	243,537	6,067	1,455,240	27,225	32,178
1853, ... ..	269,607	6,030	1,498,772	30,178	32,354
1854, ... ..	257,167	6,227	1,498,525	24,853	34,280
1855, ... ..	246,306	5,625	1,423,418	23,420	38,940
1856, ... ..	252,624	5,841	1,325,474	20,395	34,077
1857, ... ..	250,224	5,630	1,238,204	23,426	28,232
1858, ... ..	258,710	6,054	1,335,597	24,164	32,646
1859, ... ..	256,571	6,007	1,462,036	19,558	30,999
1860, ... ..	260,122	5,919	1,424,770	25,281	29,676
1861, ... ..	259,562	6,262	1,378,910	19,000	36,078

Thus we find that, comparing 1861 with 1851, the increase in the supply of beasts for the whole year was only 25,801 head; but, if we



compare 1861 with 1853, in which latter period 269,607 beasts were shown, we find a positive deficiency of 10,045 head! In 1853, the number of beasts turned out unsold to reappear for sale—and we beg particular attention to the turning-out system—was under 10,000; whilst in 1861, it was nearly 20,000 head. It follows, therefore, that the deficiency was nearly twenty thousand head. But it may be said that the local markets in the vicinity of London have increased in importance. To some extent they have; but, in numerous instances, they have been partly supplied from the London market, and during the greater portion of 1861 and the present year, much of the meat sold by the butchers at Brighton, Hastings, Lewes, Margate, and Ramsgate, as well as in the towns north of London, has been derived from the metropolitan market; so that, in point of fact, the increased supplies, consequent upon the free import of foreign stock, are nowhere to be met with. It may, however, be contended that the additional consumption has been supplied by a very large increase in the arrivals of dead meat up to Newgate and Leadenhall markets from Scotland and various parts of England. On this subject we have made close inquiries, and the result of our investigations proves conclusively that the reverse is the case. The total number of carcasses received up to those markets, since January last, has not exceeded 30,000 per week; but, in 1851, they were upwards of 40,000, and in one week in 1841, they were nearly 80,000. Of course, prices in the latter year were very low, and who can feel surprised that they were so, with enormous supplies of home-fed stock, and with a population considerably less than at present?

Having shown a deficiency in the supplies of beasts, as compared with the natural law of demand, we may now direct attention to the numbers of sheep exhibited. And here we find even a more remarkable statement—confirming as it does the pretty general impression that some potent cause has operated against production. From the above comparative table, it will be seen that in 1851 the supplies of sheep and lambs exhibited comprised 1,549,426 head, and that, in 1861, they had declined to 1,378,901 head, being a decline in them of 170,525, notwithstanding that the imports of foreign sheep increased in the same period 56,700 head, viz. from 179,210 to 235,910 head! In addition to this serious falling off in the numbers of home-fed sheep, it is necessary to observe that nearly all breeds—downs and half-breeds excepted—have shown a great deficiency in quality, although much has been said in favour of the new system of forcing animals, and of the advantages resulting from a rapid production. Clearly, we now require such a system as shall provide for the wants of all classes; but we have great doubts of the value of that which aims at too large a growth of fat. Prior to the commencement of free trade in foreign stock, there was very little difficulty in purchasing full-mouthed sheep in the London market, with, of course, a full proportion of lean on their backs. Now, however, such a description of sheep is not to be purchased. Taking the supplies collectively, we



firmly believe that they now carry quite one-fourth less consumable food than prior to 1842, and that this great deficiency has arisen from an uneasy feeling amongst the breeders and feeders, but more especially amongst the latter, owing to the introduction of disease from the Continent. The deficiency in the quantity of meat produced, however, is not confined to the sheep, since we find nearly, or quite, an equal falling off amongst the beasts. Doubtless very prime stock is exhibited at the various cattle shows; but, in reality, they form no criterion of the state of the whole country, or of the increase or decrease in the number of any particular breed, and which can only be ascertained by close inspection and examination. There is another feature in the trade requiring special notice; we allude to the import of foreign, and the demand for English, calves. Formerly the veal trade was a most important one in this country, and the number of home calves disposed of in the old Smithfield market averaged quite 500 in each week. At the present time, however, the number scarcely exceeds 100. The import of foreign calves has, therefore, completely destroyed a once profitable trade. In proof of these assertions, we may state that the total number of calves exhibited in the great metropolitan market in 1861 was 19,000, of which 16,415 were derived from abroad. If we could discover a corresponding increase in the number of English beasts fattened and disposed of, the loss of the veal trade could not be considered of any importance; but our statistics, carefully compiled from the most official returns, prove conclusively that English stock, both beasts and sheep, has received severe damage and loss from an extensive importation of diseased animals from the Continent. What then, we may reasonably ask, have we gained as a nation by free trade in foreign stock?

The table of the supplies of stock exhibited in the metropolitan market includes nearly, or quite, the whole of the foreign stock received in London, consequently, if we deduct the imports in 1861 from the total numbers shown, we find that, exclusive of the numbers turned out week by week, the supply of English, Irish, and Scotch bullocks did not exceed 215,326 head. This statement will be better understood on reference to the annexed statement of imports:—

## IMPORTS OF STOCK INTO LONDON.

Years.	Beasts.	Sheep.	Lambs.	Calves.	Pigs.
1851 ... ..	40,095	179,210	9,720	18,722	9,575
1852 ... ..	37,449	171,347	8,293	20,219	7,220
1853 ... ..	52,344	200,419	7,711	22,619	8,508
1854 ... ..	49,603	134,855	3,862	17,331	8,625
1855 ... ..	49,030	131,324	3,207	14,617	9,266
1856 ... ..	41,211	104,498	5,709	15,564	7,333
1857 ... ..	35,222	128,946	6,616	19,118	7,911
1858 ... ..	36,446	142,824	9,175	19,614	8,402
1859 ... ..	37,974	201,231	10,762	21,537	5,919
1860 ... ..	46,231	236,699	14,192	19,066	16,115
1861 ... ..	44,236	235,910	11,216	16,415	20,883



It is now necessary to consider what portions of England have benefitted or suffered from the free introduction of stock from abroad. Whilst some districts have slightly increased their supplies of beasts for consumption, others have suffered materially, and others have scarcely advanced during the past ten years. In proof of these observations, we insert the annexed statement of the districts from whence London has drawn its bullock supplies in that period:—

## DISTRICT ARRIVALS OF BEASTS IN LONDON.

Years.	Northern Districts.	Eastern Districts.	Other parts of England.	Scotland.
1851 ... ..	60,360	61,300	30,300	16,020
1852 ... ..	70,550	55,010	51,130	15,446
1853 ... ..	56,650	60,400	31,700	18,446
1854 ... ..	59,740	57,300	33,200	12,976
1855 ... ..	53,400	64,080	24,580	12,820
1856 ... ..	61,660	56,700	34,550	12,742
1857 ... ..	81,600	67,500	29,860	10,796
1858 ... ..	71,260	73,860	28,380	11,130
1859 ... ..	68,470	71,060	42,310	14,730
1860 ... ..	70,140	76,020	43,750	5,584
1861 ... ..	76,150	61,260	27,400	12,858

It must be understood that the “Northern Districts” refer to Lincolnshire, Leicestershire, and Northamptonshire; and the “Eastern Districts” to Norfolk, Suffolk, Essex, and Cambridgeshire. The statement shows a steady increase in the producing powers of the first-named counties, almost a “stand-still” system in the east, and a falling off in the production in other parts of England, as well as in Scotland. How, then, have the consuming classes fared in the period indicated? Have they purchased animal food at a less cost than previous to the commencement of free trade? In the ten years prior to 1842, the average price of beef in Smithfield did not exceed 3s. 2d., and of mutton, 3s. 6d. per 8 lbs. In 1851, nearly the same quotations were realised; but for the sake of a closer comparison, we will take the month of November, since that period to the present time. The comparison stands thus:—

[PRICES, &amp;c.



## PRICES OF BEASTS AND SHEEP IN NOVEMBER.

Per 8 lbs. to sink the offal.

Years.	Beef.	Mutton.
1851 ... ..	2s. 2d. to 3s. 8d.	2s. 8d. to 4s. 2d.
1852 ... ..	2s. 0d. „ 4s. 0d.	2s. 6d. „ 4s. 6d.
1853 ... ..	2s. 6d. „ 4s. 6d.	3s. 0d. „ 5s. 0d.
1854 ... ..	3s. 4d. „ 5s. 2d.	3s. 4d. „ 5s. 0d.
1855 ... ..	3s. 4d. „ 5s. 2d.	3s. 4d. „ 5s. 0d.
1856 ... ..	2s. 8d. „ 4s. 10d.	3s. 2d. „ 5s. 2d.
1857 ... ..	3s. 0d. „ 4s. 10d.	3s. 0d. „ 5s. 4d.
1858 ... ..	2s. 8d. „ 4s. 10d.	2s. 8d. „ 5s. 0d.
1859 ... ..	3s. 0d. „ 5s. 0d.	3s. 2d. „ 5s. 2d.
1860 ... ..	2s. 6d. „ 5s. 0d.	3s. 4d. „ 5s. 4d.
1861 ... ..	3s. 0d. „ 5s. 3d.	3s. 2d. „ 5s. 8d.
1862 ... ..	2s. 8d. „ 4s. 10d.	3s. 8d. „ 5s. 8d.

It follows, therefore, that the best beef is now worth 1s. 2d. per 8 lbs. more than in 1851, and that the advance in the best qualities of mutton is 1s. 6d. per 8 lbs., or  $2\frac{1}{4}$ d. per lb.! Apparently these figures are highly favourable to the agricultural body in this country; but if free trade in stock implies high prices, how is it that home production does not keep pace with the demand? The reply to that question resolves itself simply into losses by disease—imported, we have no hesitation in saying, amongst the foreign stock, and this brings us to the consideration of the third point laid down in the first portion of our article.

The public, generally, are well aware that a great number of sheep have been lost in Wiltshire, and some other counties in England, owing to an alarming spread of small-pox; but they are very little acquainted with the actual extent of the disease amongst sheep, or of the effects of the lung and hoof disease amongst the beasts. We are not alarmists when we state that fully one-third of the stock disposed of from time to time in our various markets, are more, or less, suffering from disease of some nature. If such be the case in open markets, how far must the evil have travelled throughout the country? It is a very common error to suppose that, because *some kind* of inspection is made of the stock which arrives in London, from Holland, Germany, Sweden, &c., and, occasionally, consignments have been rejected by the inspectors, the present system wholly prevents the introduction of disease into England. We import on the average of years, about 300,000 head of each kind of stock from abroad; but what is that number compared with the vast herds and flocks possessed in the United Kingdom, and the fearful amount of risk, attended with fearful losses, we incur in the spread of a malignant disease amongst our native breeds? It might appear difficult to estimate those losses, but our decided impression



is, that they have far, very far, exceeded the number of stock imported. Some districts in England, such as Herefordshire, Devonshire, Sussex, &c.,—*in which, be it observed, foreign stock has not hitherto been introduced*,—appear to have escaped remarkably well; but wherever experiments have been made in fattening foreign animals, and which have come in contact with our own breeds, the results have been most disastrous. Let us give a few instances of loss amongst the foreign stock purchased in the metropolitan market. A friend of ours, residing in Norfolk, purchased 200 Dutch beasts, at £16, 10s. each. They were conveyed to his farm, and placed in the stalls; but, in the course of three weeks, no less than 47 of them died from disease. Within six months, the number had been reduced to *eighty*. They were sold, some on the spot, at £20, 10s.; and the remainder—20—which turned out remarkably well, were again disposed of in London, at an average of £28, 10s. each. An eminent distiller in the metropolis purchased the same number to fatten on grains; but the loss in this instance was still more severe, 63 having died in less than six weeks, and the rest were sold as speedily as possible, at from £14 to £16 each. Were it necessary, we could multiply similar instances, but we refrain from doing so on the present occasion, owing to the want of space.

Well, then, in dealing with the fourth question—Are the precautions taken to prevent the spread of disease in this country equal to the emergency? On the arrival of the steamers from abroad, laden with stock, the condition of the animals is certainly *a matter of inspection*, and we will assume that nothing in the shape of disease is allowed to pass into the cattle market; *but what supervision exists beyond this?* The inspector in the market itself can order stock to be destroyed, if found in a *very* diseased state; but, beyond this, literally nothing is done to prevent contagion. Now, it frequently happens that many thousands of sheep—merinos—imported from Schleswig-Holstein, *via* Hamburg, are annually purchased by persons having land in the neighbourhood of the metropolis, to keep down the grass, and on speculation. These sheep, generally purchased in a very poor state, at from 17s. to 22s. each, are mixed with Lincolns, Leicesters, Downs, half-breds, &c., and, after a run of some six or seven weeks, are again brought into the market, in, as we have frequently seen, a diseased state. But the evil does not rest here. It is true that the metropolitan is not a market for the sale of store-beasts or sheep; but an immense number of those half-fat—we here refer to English breeds—are taken annually to graze and feed in Hertfordshire, Bedfordshire, Essex, Kent, Surrey, and various other counties. Need we point out the extreme danger of thus contaminating our own flocks and herds, in being penned amongst diseased stock; and need we feel in any way surprised that the disease, in a most virulent form, should suddenly present itself in more than one locality? Be it understood that the whole of the stock imported from abroad is liable to disease. It may not show itself on arrival;



but no buyer can be certain that it will not present itself within a very few days after the stock is reported: indeed, it is a well-known fact, that both beasts and sheep turned out of the cattle market unsold on the Monday have seriously deteriorated in value within less than a week, and have, consequently been sold at corresponding prices. In the lairs, there is an indiscriminate mixture of stock, diseased and in a healthy state, during several days: hence, we contend that the precautions taken to prevent infection wholly fail in their intended effects.

It may be asked what remedies we have to propose to prevent the spread of disease in the country, seeing the magnitude of the whole question bearing upon an adequate supply of food? We contend that foreign stock ought never to be allowed to mix with our own breeds under any circumstances; that lairs and slaughter-houses ought to be erected near the landing wharfs in London; and that severe penalties should be inflicted upon those who exhibit, or dispose of imported stock in open markets. These may appear to be arbitrary rules and regulations; but who shall tell what another year may bring forth, with a comparative licence to sell foreign stock, which, in a short period after being landed, may communicate disease in its worst form to our English breeds? Is it not a well-known fact, that, during the present year, the losses of home-fed beasts and sheep have largely increased, and is it not well known, likewise, that stock raised abroad is peculiarly liable to diseases unknown in the United Kingdom prior to the passing of the present tariff? It is perfectly useless to tell us that any system of inspection in this country, on *the arrival* of the stock, can prevent the introduction of disease, whilst a general intermixture is thenceforth permitted, and whilst sales are allowed for grazing purposes, because past experience has fully proved to us that such intermixture has been productive of serious and, in many instances, irreparable, loss to the grazing community. We do not argue the necessity for wholly excluding foreign stock from this country; but we do maintain the principle, that we ought, at least, to protect ourselves from the possibility of loss. The simple, though all-important, question to consider is,—can we afford to sacrifice even a moderate portion of the stock in the United Kingdom, (the value of which is very little short of two hundred millions sterling), in order that the people may enjoy the supposed advantage of a large import of foreign stock to keep down prices to a moderate level? The statistics we have given prove conclusively to our minds that, irrespective of the immense sums in hard cash which have been drawn from us by the foreigners, we have lost more in the quality and condition of our own breeds, by the introduction of diseased beasts and sheep, than is generally supposed. Whilst the present system is allowed, daily losses must arise from it, until, eventually, we may find home stock not only very scarce, but considerably dearer in price than it now is. As a great consuming nation of animal food, and with a rapidly increasing population, especially in towns and cities, our great aim



should be directed towards an increased home production. To secure that object, every effort should be made to exclude from our shores disease in every form. It will not do for the Government to remain passive whilst the enemy is at our very doors. If they really desire to protect the producers and consumers, let them call to their aid those who thoroughly understand the great question at issue, and the country may be saved from the consequences of loss and high prices, without destroying the principle of free trade in foreign stock.

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*The Prevalence and Prevention of Diseases amongst our Domestic Animals in Ireland: being a Paper read before the Royal Dublin Society, on Saturday, 13th December, 1862.* By JOHN GAMGEE, Principal of the New Veterinary College, Edinburgh.

MY LORD AND GENTLEMEN,—The subject to which I have to draw your attention this evening is so vast, that I cannot be expected to do more than state succinctly the general results of my inquiries into the diseases of animals in Ireland, and throw out hints as to the best means to be adopted for the prevention of these diseases, and the cultivation of Ireland's resources as a cattle-breeding and cattle-rearing country. I must premise, moreover, that I have paid Dublin this second visit, under a conviction that the intelligence of the age, our great necessities, and the nature of the frightful losses sustained amongst stock in the United Kingdom, must henceforward invest discussions on the questions I have to touch upon with an interest that should have been felt in them long since. The responsibilities of my position are, therefore, great—so great that I often think it has been an act of temerity on my part not to avoid them; not unfrequently have I experienced the feeling that the task was far beyond my powers, but I have great faith in the potent influence of a good cause, and during the last few months I have had many more attentive listeners to my arguments than in previous years. My object has been, and is, to show that the British Isles are favoured by nature amongst the healthiest parts of the world for the breeding and rearing of stock, and, however numerous their inhabitants, enough animal food can be produced on them for all their wants, and best when our stock is preserved from contact with the foreign importations which have cost this country hundreds of thousands annually, and have only served to spread disease, deteriorate our meat supplies, and increase the price of provisions.

I am not going to touch on this subject in the character of a conservative or a free-trader. I have nothing to do with politics, and in laying the bare unvarnished facts before the world, know that every man of sense, whatever may be his views as to the rules which should govern commercial intercourse between the different countries of the world, must admit that it is of the highest importance to protect the



property of our people, to prevent an improvident waste of life and money, and to submit, as a choice of evils, to some interference with the freedom of the subject, whenever the doings of one man, or a few, are likely to injure the million.

We have allowed stockowners to think for themselves. We have not prevented them adopting any means they could devise to save themselves from loss. We have opened our markets to the foreign producers, and, as a reward for the whole, we find that meat is getting dearer and getting worse—that speculation has taken the place of certainty—and that we must look in vain for any change for the better, unless we alter entirely the system on which our live-stock trade and our live-stock management are at present based.

It must not be thought that I purpose advocating any project adverse to the interests of the owners of stock. On the contrary, I know that the day is fast approaching when they will be the most active co-operators in a well-devised scheme for the preservation of the health of animals, though it is undoubtedly a fact that, without the aid of Government or judicious combination of the people, no scheme for such a purpose can be efficient.

To pass from generalities to matters of detail, I must mention, that Ireland is by nature the most favoured of the divisions of the United Kingdom. It is the most remote from the vast continent over which cattle plagues spread occasionally with great rapidity; it has a distinct insular position, which affords it an opportunity to control its importations of stock. Its climate is moist and temperate, and its pastures are naturally sounder than those of either England or Scotland. Why, then, should Ireland suffer more than either?

There are two classes of diseases that I have more particularly to refer to, viz., epizootic and enzootic disorders,—those maladies that spread widely over Europe, and those that are peculiar to Ireland—to Irish soil and Irish climate.

The epizootic disorders, or cattle and sheep plagues, are traced invariably to the east. They spread entirely in the lines of communication established by war or trade between different countries. They are propagated by contagion, and by contagion alone. Local causes influence their spread, but a careful study of their many outbreaks in different countries demonstrates that the local causes consist chiefly in circumstances which render the spreading by contagion most certain. These diseases commit great ravages wherever they spread, and especially in countries like our own, where their nature is ignored, and no means adopted for their prevention. They are kept in check and totally prevented in some countries, either from the circumstance that breeding is exclusively carried on in them, or in virtue of wise laws which serve to protect the home produce from foreign importations.

To illustrate these points, let us refer for a moment to the continent of Europe. Austria, Hungary, and Prussia, are in dangerous proximity to Russia, which, in its turn, suffers from the extraordinary prevalence of plagues in Asia. It is the southern or hottest part of



Russia through which the epizootics of cattle and sheep principally spread. The dreaded steppe disease or cattle plague has repeatedly crossed the Russian, and especially the Russo-Polish frontiers, into the heart of Europe. The general wars of last century, and Napoleon's campaigns early in this, invariably led to frightful losses by the disease. These losses were chiefly sustained by the countries directly bordering on Russia, but every now and then the movements of troops, or of enterprising and unscrupulous cattle-dealers, have carried the disease as far west as Italy, France, Belgium, Holland, Schleswig-Holstein, and Great Britain. The British Isles suffered twice last century. They are now protected from invasions by that disease, but how? by the great vigilance of the governments of the countries which have so much reason to dread the malignant typhus. They have established strict quarantines, and if perchance the disease appears in any of their provinces in the vicinity of the Russian confines, the slaughter of diseased and infected animals, the strict supervision of the district, stopping importation, and indeed stopping all cattle fairs and markets in the infected province, speedily exterminates the disorder. The disease is very properly attacked as a contagious disorder, and a contagious disorder alone; and so convinced are the Prussian people of this fact, that when a suggestion to convey Polish cattle to Berlin in close waggons direct without keeping them in quarantine was entertained by Government, memorials and remonstrances poured in upon the proper authorities, praying, that if such a scheme had been sanctioned, it should at once be abolished.

The contagious typhus has a short period of incubation; by quarantine it is possible to control its spread, and, thanks to that quarantine, I have not to-day to refer to any recent visitation of that disease in this country, or even to the chances, which are infinitesimally small, of its ever approaching us.

But if the contagious typhus is thus held in check in the east, pleuro-pneumonia is also held in check in the west. It is not in Holland, through which an active trade is kept up; it is not in Britain, where the traffic in diseased cattle has been annually increasing since 1842, that such a result is obtained. If we notice the progress of this disease in Prussia, Mecklenburg, Hanover, Belgium, Holland, and Schleswig-Holstein, we find it not pervading the breeding districts which are exporting for the supply of those who fatten for the butcher, but in the districts where stall feeding is carried on—where extensive distilleries, sugar manufactories, starch makers, &c., supply a rich and even wholesome refuse for the feeding of stock bred elsewhere. The animals have been bought up by dealers, sold and resold, and no sooner are they in the feeders' hands than pleuro-pneumonia appears. Here they are usually inoculated, and with far better result than I believed before visiting those countries this year.

In Mecklenburg, Schleswig-Holstein, Oldenburg, and that group of Dutch islands included in the province of Zealand, as in various other parts I could mention, the disease appears in isolated spots. The



governments of these countries at once proscribe the districts where the epizootic appears, and slaughter the diseased animals. In consequence of this they suffer very rarely and very little. The Dutch Government attempted the same system in Friesland. This province was clear of pleuro-pneumonia until the port of Harlingen became a centre for the exportation of cattle to Britain. Friesland then began to import cattle and imported disease. It has been said that it does not import cattle. The active traders in that province know well what it is to buy in the cheapest market and sell in the dearest. They frequently make excursions in quest of bargains, and especially search out diseased stocks, which may be sold in London at a sound price.

Holland imported last year—

From Hanover	.	.	.	6055	head of cattle.
„ Russia	.	.	.	6908	do. do.
„ Belgium	.	.	.	1827	do. do.
„ Great Britain	.	.	.	16	do. do.
„ Japan	.	.	.	6	do. do.

A considerable number of these passed through Friesland. In truth, the importation, after the opening of the English ports in 1842, was so active in Friesland, that the local authorities there failed to stop the disease by slaughtering diseased animals. No sooner had they cleared one district than another was infected, and they communicated with the authorities in other provinces, to urge them to assist in checking the spread of the disorder. Nothing, however, has served to protect Friesland, as the cattle-dealers' operations are far too active now throughout the whole provinces. Why should Friesland have remained free from 1829 to 1842, during which time the provinces of Utrecht, South Holland, and even Gröningen suffered? It then produced far more than its own people wanted. It exported, extensively, eastward and southward; it did not import a single head of cattle yearly. Stock was cheaper than in the Rhine provinces, and the Friesland dealer availed himself of the markets in the latter. The state of things now is precisely reversed; and the once pure Friesland is the spot in the world perhaps most polluted by pleuro-pneumonia in cattle.

What Friesland is in Holland, we find Meath to be in Ireland, Fife in Scotland, and Norfolk in England. These are the large exporting counties for the meat trade, and they import largely to feed for the butcher.

Very similar remarks to those I have made regarding pleuro-pneumonia, apply also to the foot-and-mouth disease, or epizootic apthæ. I shall therefore refer to these diseases in Ireland together.

The province of Munster was the first to be visited by them. It owes this to its ports in the south. I have made careful inquiries on the subject. Prior to the introduction of the new tariff, animals were frequently brought to this country for breeding purposes. A considerable number of Dutch cows were imported into



Cork as early as 1839, and this was due to the desire on the part of an Irish gentleman, then minister at the Hague, I believe, to infuse some of the excellent Dutch blood amongst the cattle of Ireland. At that time pleuro-pneumonia and epizootic aphtha were raging abroad. The distillers in the neighbourhood of Rotterdam and Schiedam had carried these diseases to South Holland, and they had even passed into Zeeland. It is not to be wondered at, then, that our first cargoes of live stock from that port injured us as they did. Through the port of Bristol the West of England was infected by cattle exported from this country, though it is said that the diseases traversed the British Channel, owing to direct intercourse between England, France, and Belgium.

Investigations as to the prevalence of these contagious disorders in Munster, show that they have nearly deserted Clare, they rage in Cork, Limerick, Tipperary, and Waterford. Dairy stock in Limerick is annually destroyed by these diseases to a large extent, and owing to the weekly and monthly purchases to keep up the supply of animals for the supply of milk. One gentleman alone lost 37 cows in 1853; 18 in 1855, 20 in 1860, and 30 in 1862, out of a stock never exceeding 200 head. This is one of many instances equally startling. County Cork, that was first affected, and has always suffered severely since, affords us excellent examples of special breeding districts or breeding farms, which have never been visited by the disorder, or which have suffered but once, and that owing to the purchase of diseased stock. I have had interesting interviews with some of the most intelligent stockowners in that fertile county, and nothing can be more satisfactory than the experience they adduce, demonstrating the origin and cause of the persistent prevalence of pleuro-pneumonia amongst them. If they breed, they escape; if they buy, they suffer.

This year has been a very trying one, and many of the farmers in Connaught can testify to this fact. In that province we must not look to Leitrim, Mayo, or Sligo for the greatest prevalence of pleuro-pneumonia and the foot-and-mouth disease. Roscommon is also, to a certain extent, a privileged county, but Galway has been a great sufferer. Such fairs as those held at Ballinasloe concentrate to one spot a people engaged in cattle-dealing. Hosts of jobbers are about the country, driving animals of all kinds, and disseminating disease. The mortality amongst cattle in Connaught varies as much as from 1 per cent. in breeding districts, to 8 per cent. where there is active dealing. Some of the healthiest districts are in Mayo and Roscommon. On the whole, however, Connaught is healthier than Munster, and it contrasts favourably, also, with Leinster.

The stockowners of counties Carlow, Kilkenny, Wicklow, and Queen's County have not, however, the yearly losses to record by contagious disorders, that interfere much with the graziers and stall-feeders of Kildare, King's County, Louth, Meath, and Dublin. Dublin has suffered more severely and constantly than any other part of Ireland. This city supplies us with the same facts that may be obtained in any of the large towns of Britain. Cowfeeders own stocks



that are dying off or slaughtered diseased, at the rate of 60 and 70 per cent. annually. I never heard more startling revelations than those made by some of the Dublin cowfeeders, when I was here in the summer. I visited the Phoenix Park, and saw the wretchedly diseased condition of the animals found amongst town cows, though breathing the fresh air, and grazing on good pasture. In Dublin the cows are turned out during the summer. They are not, as in Edinburgh and elsewhere, kept constantly tied up; and yet the Dublin people have to devour, annually, many hundreds of these animals, victims of the ever-raging pleuro-pneumonia. Many of the dairymen, keeping from 28 to 30 cows, assured me that this annual loss amounted at least to L.100 per annum, and often as high as L.200, notwithstanding that they sold all their diseased animals to the butcher, at prices varying from L.2 to L.5. I visited the filthy and close slaughter-houses in the crowded districts of this city, and saw dozens of animals slaughtered diseased. Lungs of cattle affected with pleuro-pneumonia could be collected by the score. In one yard, I saw 10 head of cattle, 9 of which were suffering severely from pleuro-pneumonia. Some of these were from the Dublin dairies, but large numbers had been purchased in the Dublin market, to which they had been sent by farmers in this and adjoining counties.

I saw the dairymen squeezing pus and blood into their pails, as they moved about milking their diseased cows, and was rather consoled by their statement that of late years much less milk was drunk in Dublin in proportion to the population than formerly. The poor people's children could indulge in goblets of cheap and wholesome milk 25 years ago, but the rich must pay much to obtain a little and bad, at present. This state of matters is not restricted to Dublin; and I have insisted for a long time on the fact, that our infant population in large cities must be seriously injured by the milk supplied for it. Indeed, I know that the milk of town cows is rendered unwholesome and poisonous by the prevailing epizootic, the foot-and-mouth disease.

To return, however, to the prevalence of disease in agricultural districts, I must revert to the fact that the extensive graziers of Leinster—those who fatten cattle for the Dublin and English markets—those who own the finest stock in this country—who only get stock when it has attained the maturity to which it is permitted to arrive prior to a final preparation for slaughter—are the persons who now relate sad tales of destruction by contagious maladies. Their experience proves, that if they were prevented supplying our people with diseased meat, they must be ruined—that, buying constantly, as they do, in the largest markets, they must sell out their diseased stock to the greatest advantage, and ship a great portion of it to Great Britain. This practice is the great curse of the country—the immediate cause of the loss of thousands upon thousands to the farming community.

I have yet to allude to Ulster. It affords as striking an illustration



as the other provinces of the prevalence of pleuro-pneumonia and epizootic apthæ near the busiest centres of the cattle trade, and their absence in the breeding counties or districts. Travel County Cavan and you fail to find contagious disorders, except in a few isolated spots, and very rarely. Cattle are there bred and disposed of as two-year-olds. The very stock that dies in the hands of the Meath farmer lives on healthy in Cavan—and why? Before the Meath farmer gets it, it has to travel, it has to pass through the hands of dealers, and through many markets. It cannot escape such an ordeal, and a few days or weeks after passing into the hands of its last owners, prior to being slaughtered, it proves infected with diseases caught in the short journey from Cavan to Meath.

The counties Monaghan, Tyrone, and Donegal are far more free than the eastern section of Ulster. There is a singular and very significant observation that I have made with regard to Antrim and Londonderry. The neighbourhoods of Belfast and Derry have been frequently visited by pleuro-pneumonia. The neighbourhood of Derry especially has suffered severely. It suffered very early. Shortly after pleuro-pneumonia had appeared in Cork and Dublin, some cattle from Glasgow carried the disease to the far north. Thus contagion led to the disorder appearing in districts remote from each other, at extreme parts of the country, almost at one and the same time. If Antrim is surveyed in search of contagious diseases, we find a large extent of country as free as Cavan. It produces cattle for elsewhere, and does not require to buy. Where it does buy and sell much, viz., in its southern portion, contagious diseases break out.

I might be tempted to enter into greater details, but I would occupy your time much longer than I can in reason wish. I must mention, however, that contagious diseases in Ireland induce annually quite 50 per cent. of the total losses by disease. In some of the districts I have referred to, fully 70 or 80 per cent. of the total of deaths result from pleuro-pneumonia. These contagious diseases are kept up by the trade in diseased animals, by the farmers purchasing calves from dairies in town and elsewhere impregnated with disease, and also by a considerable yearly importation of calves from the great centres of disease, viz., the dairies of Liverpool, Manchester, Birmingham, Bristol, and elsewhere. Persons engaged in the cattle trade have assured me in Dublin that the foot-and-mouth disease was introduced this year and last entirely by diseased calves. These animals are born where the atmosphere is constantly poisoned by the presence of diseased cattle, they are then much ill-used, brought across the Irish Channel, and sold in the Dublin market. It is to the interest of the Irish stockowner that the importations from Britain should be narrowly watched, and, I believe that, with great care, a system might be devised to render the spread of contagious disorders from Great Britain to Ireland extremely difficult. Ireland could be cleared in two years of these contagious diseases, and this without molesting the stockowner, but, on the contrary, materially



assisting him in the development of the resources of the land he cultivates.

I must not omit to mention, that the Irish farmer who sends his diseased animals to England, contaminates the very vessels and railway trucks in which he has them transported, and must expect to receive back the produce of the virus he has helped to disseminate.

But if I have given the epizootic or contagious disorders a prominent place in this paper, I feel that the importance of the study of enzootic disorders must be of more permanent interest. The day must come, and is fast approaching, when science and capital will be devoted to the prevention of plagues. That day is more distant when we shall cease to hear of dozens and hundreds of animals dying in various directions from causes that are purely local, and that lead to the development in districts of diseases that do not spread beyond the soil of their spontaneous origin. It is in this department of study that veterinary science can permanently aid agriculture; that original investigations are needed to determine where animals should be bred, where they should only be grazed or fed, when they have attained maturity, when they should be supplied with artificial foods, or not allowed indiscriminate range over the most luxuriant pastures.

If within the last twenty years contagious diseases have been very rife, during that period the extermination of some enzootic disorders has been observed, owing to improvements in agriculture, and especially to the extensive and thorough drainage of land. But the forcing system, on the other hand, has led to the development of diseases of a different and very fatal nature, which occur here and there quite unexpectedly, and sap the resources of the country as much as they puzzle the suffering farmer.

Widely disseminated over the world, we have soils which are fertile, but damp, on which the rearing of young stock is always attended with great danger. The disease developed in these soils is the anthrax, or carbuncular fever of continental authors; the black leg, or quarter-ill of this country. In every climate the disease appears. It has been observed in the Polar regions, as in Lapland and Siberia; it prevails also in the temperate and tropical zones. I find in Ireland and in Scotland that it is chiefly witnessed in valleys along the base of mountains, where the pastures are rich but damp, the soils stiff and retentive. It is, however, seen on the highest portions of the Grampains and Pentland Hills, on the mountains of Wicklow and Mourne, as in those of Kerry, Donegal, and Mayo.

The countries in which human beings are most subject to ague, are also those in which the quarter-ill of cattle is most malignant, and though this disease prevails widely in the Three Kingdoms, we find it far most dangerous and destructive in southern Europe. During the progress of the disease there the development of an animal poison is noticed, capable of inducing the malady in all warm-blooded animals and malignant pustule in man. This virus develops in some countries, such as our own or France, only in the warmer months, and



more rarely in the coldest and driest districts, in which the disease can appear. Closely allied to black-quarter, and belonging to the class of carbuncular affections, according to continental authors, we have the fatal braxy of sheep; the destructive hog cholera, or blue sickness; the blain, or glossanthrax of cattle. Though these diseases prevail to a frightful extent in Ireland, and especially the hog cholera and black-quarter, they are more easily prevented here than on the majority of soils. There are no vast marshes or fens, the bogs are, for one reason or other, not insalubrious, and we find that, generally, animals must be predisposed to disease by being badly kept in winter, and then suddenly changed from bare to luxuriant pastures, in order to develope the malady. A judicious system of management would certainly put a stop to quarter-ill and the hog cholera wherever they appear. They are diseases which prevail extensively in Munster. The hog cholera devastates more or less every county in that province, and losses of 20, 30, 50, and 80 per cent. have been reported to me by many. Black quarter is also rife. It is rare in the lightest and most porous soils of Tipperary, and is not so common in Waterford or Cork as in Clare, Limerick, and Kerry.

In Connaught black quarter is very prevalent. The hog cholera not so bad as in Munster.

Black quarter prevails somewhat in Leinster, where the pig distemper is as rife as in Munster. The Ulster farmers also report the frequent appearance of both diseases.

These maladies are therefore more generally distributed over the land than the contagious diseases, and more than any other enzootic disorder. Thousands of diseased pigs are annually sold to ham and bacon factors, and from the red or purple colour of their blotched skins are called 'red soldiers.' I need scarcely say, that the Irish manufacturers of these delicacies are anxious to lead the public to believe that none but healthy pigs fall under their knives, and hundreds of diseased hams may be seen exposed for sale stamped 'Prime York,' whereas no such disease exists in Yorkshire as the one so destructive amongst the Irish pigs.

I shall not detain you by special reference to such diseases as red-water or blood murrain, the dry murrain, &c., which are very generally distributed over the whole country. I have to notice, however, that in districts where black-quarter once destroyed many yearlings there is now splenic apoplexy. It is a disorder incidental to plethora or fulness of blood, attacking animals that are being fattened for the butcher, and destroying the majority of such animals when it appears on a farm. One farmer in County Meath told me that he lost many cattle to which he was allowing 4 stone of mangolds and 14 lbs. of artificial food daily. This farmer also said that Dublin was close at hand for the diseased stock to be sent to. I have known a large number of animals, seized with this very fatal disease, sent forthwith to butchers in large towns; but within the last two or three years we have discovered that the flesh of these animals is very unwholesome.



One of my students reported, in 1860, that a pig having eaten of the abdominal contents of a cow that had died of splenic apoplexy, was seized with symptoms of a putrid fever, and died. This year I had occasion to publish a report from Mr Aris, of Wellingborough, in which he said, "Pigs die rapidly after eating any of the offal of the diseased animals. I attended a very valuable mare which had died with all the symptoms of the disease, and she had been employed to draw one or two dead carcasses out of the yard. I have great reason to believe she became infected from the diseased animals." Professor Simonds also this year witnessed similar accidents from the blood of cattle suffering from splenic apoplexy having been thrown into a yard where pigs ate it and died. Dogs were affected in a similar manner. These observations are confirmed by those of many continental veterinarians, and I think all will admit that we should not suffer the carcasses of animals to be sold as human food, when the blood of these animals can poison pigs and dogs. The disease is one that can be entirely prevented, and the losses need not be severe if professional aid is sought when the malady first breaks out on a farm. Preventive measures must be adopted, as, when the symptoms of the disease appear on an animal, death is almost a certain result.

Splenic apoplexy, like black quarter, seizes the finest animals of a herd, and lays them low in from four to twenty-four hours. The French express themselves very appropriately when they say, '*Les animaux paraissent foudroyés.*'

The change, then, in the nature of our enzootic diseases bids us be more careful than we have been in permitting an unrestricted traffic in diseased meat.

I shall not attempt to say much concerning the diseases of sheep. The rot, so prevalent in County Clare, also witnessed in Galway, that has even attacked cattle in Kilkenny this season, destroys not less than 4 or 5 per cent. of the total sheep stock of this country. There are sound lands on which the rotten sheep purchased at the large fairs are taken, and serious losses are incurred by farmers. Any one having grass on which he wishes to place sheep for a certain time; purchases in Ballinasloe or elsewhere, and finds that an apparently vigorous flock wastes on the best keep, and must be disposed of diseased. Not a few of the Meath farmers can record examples of this description.

Sturdy, foot-rot, and red-water, or blood-disease in high-fed sheep, swell the mortality lists. They are all diseases that can be prevented with a little attention, and by following out rules which a knowledge of their nature has enabled us to establish.

I have noticed the hog cholera, that dreaded distemper which has raged this season, and for many years past, with the intensity of a plague; but in its influence on the human health, the malady well known in Ireland by the name of measles, is far more injurious. It is essentially a disorder of this division of the United Kingdom. It is unknown in Scotland and England in the widespread form it pre-



vails here. But it must not be supposed that the disease has not undergone changes with improvements in agriculture. In some parts of Ireland, measles has been on the decline; in others, it has remained stationary. It has been exterminated in those districts and counties where farmers rear large numbers of pigs on wholesome farm-produce, and keep them amongst the animals of the farm-yard. If, however, we go through Tipperary, Limerick, portions of Cork, and other counties, we see swine living with human beings. They enjoy freedom around the cottage, of which, according to an old Irish saying, they are the real tenants. They devour all filth, and, amongst other matters, human excrement. They swallow the ripe joints of tape-worms, and the ova of these develop into the *cysticercus cellulosæ*, the measles found in thousands distributed over the whole muscular structures of the pig.

So thoroughly has the system of utilizing diseased flesh as human food become established in this country, that respectable firms employ 'measle-tryers' to detect the measly pigs out of a lot bought in market, so as to claim a reduction on them. They cure them, and sell them at the small reduction of three shillings a fitch. From the open condition of the textures of these diseased animals, they pickle well, they are never tainted, and English bacon-dealers apply regularly for measly bales of bacon. Let it not be supposed that these parasites are destroyed by the pickling process. Fortunately myriads of them are destroyed in the process of cooking, but unfortunately there are many people, far more than any non-professional person would imagine, who acquire a morbid taste for underdone or raw food, especially pork, whether pickled or otherwise, and they rarely fail to suffer in consequence. A gentleman having great experience in the bacon trade, assured me that when the famine in Ireland stopped the supply of pigs for the English bacon factories, and they had to buy English pigs, they found no measles. It was rare to meet with a measly pig. They invariably got animals thus diseased from Ireland. Many of you here will have greater experience than myself regarding the districts where pigs are kept singly by the poor, and where they are chiefly enclosed in farm-yards. As a rule, measles will be found to prevail in the first, and not in the second. Is it not frightful that three per cent. of the Irish pigs should be affected with this loathsome disease?

I am led now to lay before you some statistical facts. That they are facts, you must accept this evening on my word, as I cannot enter into a statement of how they have been collected and calculated. They have been chiefly obtained from farmers, from cattle insurance agents, from my own personal inquiries, in different parts of Ireland; and I am deeply indebted to the assistance of Dr Kirkpatrick of Glasnevin, without whose exertions I could never have met you this evening, supplied with much of the information I have laid before you.

The mortality amongst cattle in Ireland varies from 2 per cent. in a few districts, to 12 per cent. in others. The average over Ireland



is never less than 5, and some years exceeding 7. This is the loss by fatal diseases, but as all farmers are aware a heavy loss is incurred annually by maladies which do not kill, but which deteriorate the condition of stock, and lead to greater loss of time and food. This is the case when the epizootic apthæ prevails, as it has done of late. This loss cannot be calculated at less than one per cent., so that I am sure I am not overstating the yearly loss, when I declare that it attains in Ireland, from all causes, 6 per cent. The last return shows that there are 3,250,396 head of cattle in Ireland, of which, therefore, there is a loss, in round numbers, of 195,024. A very careful study of the losses in cattle has led me to determine that it is the best stock that is destroyed, so that it is fair to calculate the value of the animals lost at the average value of the total stock. Mr Donnelly's valuation of L.6, 10s. a head is not a correct one. It is very much below the real average value; nevertheless, even accepting that the lost animals are on an average not worth more, Ireland loses L.1,267,656 annually by losses amongst cattle alone. We are far nearer the mark if we value the dairy, grazing, and stall-fed stock, amongst which the largest amount of loss is sustained, at L.12 per head, and that gives a total loss of L.2,340,288. Of that loss in this country, 60 per cent. is the result at present of contagious disorders.

The average loss on sheep, over the whole country, is not less than one per score; it often exceeds this. The loss in money amounts to L.190,173.

The lowest estimate I can make of the mortality amongst pigs in Ireland is 10 per cent. Were I to listen to the statement of losses amounting to 50 and 60 per cent. over wide districts, I would have to double that estimate. But, on the most moderate calculation, Ireland loses annually, in round numbers, 150,000 pigs, amounting in value to L.187,500. Taking the Registrar General's calculation of the value of the stock of the country, viz., L.31,204,325, we have an annual loss on it of L.1,645,329. I consider this to be far below reality, and if we take my valuation of the cattle at L.12 a head, the annual loss amounts to L.2,718,961.

I have no doubt there are those who will think that there must be some mistake in all this; but I am confident there is not; and any one devoting himself to the collection of statistics on the subject will find that I am much below instead of above the real loss which Ireland annually sustains from disease amongst cattle.

If any man of sense devotes a little attention and thought to this subject, he must be driven to the conclusion, that to live in ignorance of facts such as I have here brought out, is culpable; and, when the real state of things is known, it can only be regarded as a great act of negligence and improvidence, that men of talent and industry should not devote their time to the institution of a system which would be the best guarantee against the recurrence of famine, and would tend rapidly to increase the wealth of the country.



I unhesitatingly affirm, that 50 per cent. of the loss I have alluded to could be saved within a couple of years of the active working of a scheme intelligently framed for the prevention of disease. The working of such a scheme, though expensive, would amount to a mere trifle in comparison with the loss. Recent calculations would indicate that the expenditure would amount to about 2 per cent. on the smallest estimate of annual losses.

Any scheme adopted must aim at suppressing the traffic in diseased animals and the sale of diseased meat, affording advice to the stock-owners when disease appears, and studying carefully all the facts relating to the prevalence and causes of enzootic disorders, with a view to suggest preventives. The stockowner must and can be protected by timely advice and co-operation. It would be absurd to say to him, We care not if you are ruined, but we shall not permit you to sell your diseased animals. This would materially tend to increase the yearly deficiency in the breeding of stock, which it is so important should increase in proportion to our wants.

How such a scheme is to be worked out, it is at present premature to say. I am anxious that the evil existing should be exposed; that instead of permitting a system adopted as the best of bad ones by the farmers to keep all secret, we should have everything open and above board. No enemy is more dangerous than one that is invisible. At present the general impression is, that there is no serious cause for taking into consideration the losses resulting from disease in stock. These losses are not recognised as they should, as exerting a great and bad influence on the nation; and the capitalists who swell the mass of diseased meat sold to the public, by disposing, when occasion requires, of their diseased stock, are individually desirous that this vast subject should not be broached. When the potato crop fails, the peasant's family is deprived of its humble but sufficient meal. The starving poor appeal to our sympathies, and the whole kingdom is anxious to find a remedy for such a disaster. But if Ireland does lose between two and three millions sterling annually by disease in cattle, the poor are affected indirectly, though with equal certainty. The real cause lies hidden and escapes observation. No effort is made to counteract it. Prevent that loss and you will soon find the yearly decrease in the production of stock converted into a decided increase. The farmer's income will be augmented, the labourers employed will be in greater number, and the landlord's rent paid with regularity.

This great question concerns Government, as it involves the protection of the best property we have—the produce of our fertile soil. Past Governments have unwittingly led to a deterioration in the value of that produce. Free trade in stock has been an experiment which has injured every country that has tried it, unless regulated by laws based on a thorough knowledge of the nature of contagious disorders.

Let the public state, in unmistakeable terms, that it wishes wholesome food for its honestly acquired gold—let the farmer plainly assert



that he must be ruined, unless he be permitted to dispose of his diseased stock to the butcher; and, with these points clearly before us, the remedy can be applied.

It is a remedy that has been most successful elsewhere, and it consists in applying veterinary knowledge to the prevention, rather than to the cure, of disease—in having able men to investigate at any moment the causes of mortality amongst stock; and, fortunately for us all, the diseases of the lower animals are simple in their nature, and their prevention is certain.

My suggestion, therefore, is, that the public should manifest an interest in the matter, combine, if you like, and show a readiness to assist Government in any scheme sufficient to meet the evil, provided that scheme be for the good of all. If you are incredulous as to the possibility of preventing all the diseases I have alluded to, hesitate not to prosecute inquiries, to attempt experiments, and then aid in suggesting good measures if others propose bad ones. I invite you not to be deceived by the treacherous appearance of the surface of things. Face manfully an inquiry into the whole subject, and do this with a determination to further, by all means in your power, the interests of the farmer and of the general public. I do believe that the highly educated and intelligent men likely to influence our Government in these matters will do so in a manner calculated to effect much good; but in this country, fortunately, the voice of the people is listened to, and I sincerely trust that after these few words of caution, the feeling manifested by the agricultural community will be in favour of an uncompromising attitude against all who seek to blind themselves and others to the realities of the case, and are inclined to let matters take their course as for the past. I am not an advocate for coercive measures. I want to work out a remedy. That remedy is discovered so soon as you have established the nature of prevailing diseases and their causes.

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*Opacity of the Cornea in Heifers (Corneitis?)*

By W. A. CARTWRIGHT, M.R.C.V.S., Whitchurch, Salop.

I AM not aware that any allusion has ever been made, in either of our periodicals, to cases similar to the following ones, of which I have merely sent these as illustrations of others that have recently occurred in this neighbourhood, and at former periods.

From my experience, they generally occur in two or three year old heifers; but now and then the disease attacks rearing calves as young as six months old. Generally, they become affected when they are out at grass in the summer, and in the instances that I have seen they had been grazing on what is called “old turf land.”

I cannot at all assign any other cause than plethora and a pendent position of the head. Every now and then I hear of some being lost by the disease, but, as far as I can learn, it has been from bad treat-



ment, by blowing various powders on the eye, and neglecting more powerful measures.

I am perfectly convinced of the truthfulness of the observation of Dr Mackintosh, in your number for November last, that *thousands* of pounds would yearly be saved in Great Britain if stockowners would but apply for *early* professional aid; and there is no part of the body that requires greater skill to treat than diseases of the eye; yet, on the contrary, these cases are awfully treated by druggists, quacks, farmers, and others, little thinking what misery they cause the poor animal, independent of the loss the owner may sustain.

It is really surprising to what an extent such a delicate organ as the eye will recover if properly treated, yet almost every Johnny-raw thinks he is justified in blowing one thing or other on it, to "eat it off," as he says. Pity but what a little "experience" was tried on him.

CASE 1.—On the 3rd September, 1862, I was sent for to see a two-year-old short-horned heifer, that had a bad eye, the property of W. P. Churton, Esq., of Edgeley. I don't know how long it had been so, but at present there is a light greyish opacity covering nearly the whole cornea of the right eye, but it is much worse near the inner side, where there is great effusion of yellowish lymph, apparently between the lamellæ of the cornea, and has almost the appearance as if there was a chaff on it, but I don't think it is so. It looks as if it had existed for some days, and there does not appear to be much inflammation about the parts, but still there is a great discharge of tears and intolerance of light.

*Treatment.*—V.S. ad Oviiij., gave a purgative, and ordered the eye to be fomented, and for her to be kept up.

6th. My son saw her, who informed me that her eye was worse, but that the medicine had operated.

9th. I saw her. The opacity is a great deal worse; indeed, the eye, I fear, is completely lost. Most of the central portion of the cornea now bulges out in front, and is more of a white colour, and there is now every probability that pus is forming inside the eye, or within the lamellæ of the cornea. The outer rim of the cornea, for about a quarter of an inch in width, is intensely inflamed, and looks like one mass of blood. I cannot conceive that any treatment is of the least avail. To be turned out into the field.

10th. About the same.

12th. The centre of the eye is more prominent than ever, as if full of pus, and the outer circle of the cornea is still one mass of blood. To be left to nature.

28th. I have not seen the eye from last date. It is now very much altered in appearance from when I last saw it. Instead of being bulging out, and having the appearance of an abscess, it is now gone down to its natural size, and there is not the least vestige of that yellow-white appearance that was so prominent in the centre and around, and all the intense inflammation that was surrounding is entirely gone; but still on, there is a good deal of disorganization



within the coats of the cornea, as some parts of it are a little white and others speckled black, yet I believe she can see a little. I could not see into the interior so well as I could have wished.

Put a little of solution of potassa iodid. within the lids and on the surface of the cornea. Turned out again.

Nov. 11<sup>th</sup>. There is a good deal of discoloration of the cornea yet, but I think the eye, upon the whole, is much better, especially on the outer circle, through which she can evidently see.

Put a little more of the potas. iodid. within the lids and on the cornea.

There is now no inflammation about the eye or discharge of tears, but is got more in a chronic state, and absorption is taking place. I saw it some time after, when it was still improving, and a common observer would not notice any difference in the eyes.

CASE 2.—On the 3<sup>rd</sup> September, 1862, I also saw another small, half-bred two-year-old heifer, the property of the same gentleman as the last, that had a bad off-eye. She was feeding well, and was half-fat, and in perfect health except the eye. On examining her I found that there was a large spot of milky-coloured opacity on the inner and lower surface of the cornea, but one part of the opacity was more dense than the other. There was a good deal of inflammation about it, and tears issued very freely, and there was great incontinence of light. It had only recently been seen.

*Treatment.*—V.S. ad Ovj. and gave a purgative, and ordered the eye to be fomented, and for her not to be turned out at present.

6<sup>th</sup>. My son saw her, who said the eye was better.

9<sup>th</sup>. Saw her myself. The opacity is now nearly gone, there only remaining a slight prominent speck with a little diffused opacity around it. To be left alone and turned out.

10<sup>th</sup>. About the same.

12<sup>th</sup>. Still better. Put a little of solution of potas. iodid. within the lids.

28<sup>th</sup>. Scarcely anything the matter with the eye, which was soon after well.

CASE 3.—On the 9<sup>th</sup> September, 1862, I saw another two-year-old heifer, out at grass, with a bad off eye, belonging to the same gentleman as the preceding ones. On the cornea there was merely a milky-coloured opacity the size of a sixpence, and which opacity was more dense about its centre to a little below, with diffused opacity around. There was no inflammation around the opacity, but the eye-lids seemed larger than natural, and tears flowed pretty freely, and there was intolerance of light. Her general health seemed good, fed well, and was in very good condition.

*Treatment.*—V.S. ad Ovij. To be kept up, and the eye fomented.

10<sup>th</sup>. I thought the surface of the centre of the opacity seemed covered with a little flocculent matter, as if sloughing off, and the circumference of the cornea, just over the iris, was a little inflamed. Gave haust. purg.



12th. Better. Opacity less, and there was scarcely any of that flocculent appearance on the opacity. Put a little of the solution of potas. iodid. within the lids and on the opacity.

After this she gradually got better without any further treatment, and in a month or so her eye was all right again, and she was out grazing all the time.

CASE 4.—On the 28th October, 1862, I was again sent for to another two-year-old heifer, in calf, belonging to the same gentleman, that had got a bad off eye like the others. The bailiff could not exactly say how long it had been bad, but he believed it could not have been so many days. Now there is an opacity nearly the size of a sixpence, of a greyish colour, with a yellowish spot in the centre of it (like an abscess). There is no particular inflammation surrounding the opacity, but the eye weeps, and tears are continually dropping, and she dislikes the light. She looks to be in perfect health, and feeds well.

*Treatment.*—Took 2 quarts of blood from the neck, but as she did not bleed so freely as I could wish, I punctured the nostril with a penknife, and she bled as much as I wished. Then I gave a purging drink, put a few drops of the solution of potas. iodid. within the lids, and ordered her to be kept up.

Nov. 1st. This day my son saw her, who informed me the eye was much better, and the opacity around was a great deal less, and that there was not so much of the white spot in the centre. He put a few drops of the potas. iodid. on the cornea and within the lids. To be kept out at grass.

11th. It is now well, and as clear as ever it was.

CASE 5.—On the 24th July, 1862, I was sent for to see an aged cow's eye, the property of A. Worthington, Esq., of The Mount, in this town. I found that at about the centre of the cornea of the off-eye there was a milky-coloured opacity, about a quarter of an inch in diameter, and in the centre of it there was a small speck of apparent ulceration as if some thorn had punctured it; but that it was the cause, I rather doubt. There was no particular inflammation about the eye or cornea. I gave her a purgative, and ordered the eye to be fomented. In a few days after I touched the centre with a little caustic, and in the course of a week or so after it was nearly well, and soon after it got perfectly so.

### *The Recent Sudden Mortality amongst the East-Lothian Fox-Hounds.*

By Professor GAMGEE, Sen., New Veterinary College, Edinburgh.

IN the *Edinburgh Veterinary Review* for November, I published a short account of the extraordinary occurrence of death, by which, without any ascertained cause, nine couples of hounds were suddenly carried off.

Enveloped in mystery as the disaster was, I gave as faithful an exposition of the facts in connection therewith as my knowledge en-



abled me to do. Failing, as we all had done, to discover the cause of the malady, I closed my paper by stating that I had described the case, so that, should anything hereafter be learnt or suggested, the whole might be re-considered with the additional evidence.

Just six weeks after the publication of my paper, Professor Dick, who, as well as myself, had been consulted while the hounds were ill, has published his account, including correspondence, chemical report, and resumé, which altogether occupies four columns of a weekly agricultural paper.<sup>1</sup>

On learning that such a lengthy account had been published, long after the disaster, and also from the date of issue of my paper, I expected to find obscurities cleared up. When, however, I had read to the end of the long article, and had devoted an evening over it and the whole case, I discovered that I had spent so much valuable time to no purpose. Not the shadow of a new fact does Professor Dick's account contain, whilst his speculations and conclusions have either no reference to the case in point, or are drawn from fictitious data.

In the published letters embodied, there are two items of information conveyed, which Professor Dick makes no account of. Mr Atkinson, the Huntsman, reports the death of a bitch, which happened in the night of the 29th September, on which the correspondent says:—"I have sent you a hound that I found dead in the yard this morning (30th). She fed well yesterday afternoon, at four o'clock; instead of taking her out on the grass with the other hounds, I turned her into the large yard, where the others have been; and whether she picked up anything or not, I don't know. I should like you to analyze her well. I shall send her to you by train, sealed," &c. This bitch had not hunted this season, but had recently nursed a litter of puppies.

We shall presently refer to Professor Dick's remarks on the case of the bitch.

I may notice here the second series of facts, which are related by Captain Kinloch, who says in a note, "The hounds have twice been taken with similar symptoms, in each case hunting in the same covert; *always* early in the season, *never* as the season went on, but never so badly as in the present outbreak. On one occasion, Mr Fletcher lost three hounds out of ten couples affected. Last year several hounds were ill after hunting there, but none died."

Here I recognise some most important information, which, if we cannot now fasten it to any holding point, is worth keeping.

The communication last referred to, and that of the Huntsman, reporting the death of the bitch, confirm the prudence of the measures I recommended whilst the hounds were still ill, and when it was hoped that fewer of them would have died. In a note to Sir David Baird, I advised great care relative to the diet; and suspecting, as we did, that something noxious to their health lay undiscovered in the wood in which they hunted immediately previous to the attack, that

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<sup>1</sup> See *Periscope*, page 44.



the hounds should not draw that covert again before seasonable rains had fallen in abundance.

I see no reason, from all that has yet been revealed, that would lead me to alter or add to the advice I gave on the 24th of September.

Returning to a notice of Professor Dick's paper, he tells us that he was summoned to the East-Lothian kennels on Tuesday the 23rd of September, where sudden disease had occurred among the fox-hounds, of which several of them had died. I submit that there is some mistake as to the time when the first deaths of the hounds took place.

On Wednesday morning, 24th Sept., I received the following letter from Sir David Baird:—

“SALTON KENNELS, *Tuesday*,  
(23rd September, 1862.)

“DEAR SIR,—Upon the whole, I find the hounds in a better state than they were in yesterday; however, those that were worst yesterday are still in a very bad state. It is also an odd circumstance, that the hound which showed the least symptoms of the disorder is in the worst state to-day. However, I think we are fortunate in having them all alive still. We are going on with the same treatment as yesterday, giving some of the weakest of them some port wine mixed with arrowroot. I trust they may continue improving. I will write you again.—I have the honour to remain, &c.

“D. BAIRD.”

Thus it is clear that none of the hounds were dead on Tuesday afternoon. We received the first one at the New Veterinary College on Thursday morning by rail, and though it was not stated when it died, I concluded, from its appearance, and from the understanding, that, as soon as the first one died, it should be sent on, that he had died on the previous day (Wednesday). As soon as the post-mortem examination of the hound had been performed, a report on it was sent to Sir David Baird, with a view to contribute in the research, whilst the viscera were taken to Dr Stevenson Macadam's laboratory, where the whole were tested by that able analyst, who drew up a report, which was also forwarded to the Honourable Master of the Hunt.

That chemical report we did not then publish, because nothing poisonous had been discovered, and it was of a purely negative character, and was as follows:—

“SCHOOL OF ARTS AND SURGEONS' HALL,  
EDINBURGH, 6th October, 1862.

“I have carefully examined portions of the viscera of a dog forwarded to me by the New Veterinary College, Edinburgh, and stated to be from the Saltoun Kennels. The portions consisted of (1) the stomach and contents; (2) a piece of the intestine and contents; (3) the liver; and (4) the spleen; and the whole was enclosed in a brown earthenware jar, securely covered with paper, and delivered at my laboratory by Mr Murray, Demonstrator in the New Veterinary Col-



lege. The several parts of the viscera were examined for poisonous agents, including strychnine, arsenic, lead, mercury, copper, antimony, morphia, &c., and not the slightest trace of any ordinary poisonous ingredient could be detected by me. In endeavouring to account for the death of the dog belonging to the Saltoun Kennels, I would suggest that portions of any water which they may have partaken of within a short period of their death, should be forwarded for chemical examination; and it would also be advisable to transmit the whole carcase of one of the dogs, so that a more full chemical investigation might be made as to the presence or non-presence of poisonous ingredients.

(Signed) "STEVENSON MACADAM, Ph. D., F.R.S.E.,  
"Lecturer on Chemistry."

It will be observed that the above report of the analyses made by Dr Stevenson Macadam negatives the presence of any ordinary poisonous ingredient, and the subsequent report of Dr Murray Thomson, which was published with that of Professor Dick, confirms the accuracy of Dr Macadam's analyses. The last paragraph of Dr Thomson's report is as follows:—"In concluding this report, I have simply to remark, that the chemical examination does not throw any light on the death of these animals, nor on the morbid appearances which their organs were found to present."

I have now to deal with Professor Dick's conclusions. He says:—"The preceding report proves the absence of any poisonous material;" whilst I say the report proves nothing at all. Mr Dick says "the appearance found upon dissection clearly showed the seat and nature of the disease of which the dogs had died, which were distinctly shown in the inflammatory process." I submit that in the last condition of the viscera, we saw nothing but the effects; the first cause, as well as the first and second stage of the disease, have been wholly passed over in his, Mr Dick's, summary of conclusions. What caused that spasm, vomiting, and purging, which gave rise in every hound that died to invagination of the intestines, and which, I have no doubt, occurred within the first hour or so of their severe attack? It was this condition of the intestines that rendered every effort to relieve abortive, and which led to the other morbid appearances observed after death.

If we conceive a ligature passed round the small intestine of an animal, and that he linger on for several days, we shall have a state analagous to that of the East-Lothian hounds in the latter stage. I am persuaded that the hound we examined, which died on Wednesday, 24th, had his intestines in the same impervious condition when I saw him on the Monday, as when he died in consequence, and when six inches of intestine with the omentum were drawn into an inverted part of the same, forming together a hard cylindrical mass; it is matter of surprise to contemplate the length of time most of the hounds lived before they succumbed after intussusception had taken place, and but for which, probably none would have died, since they all withstood



the first shock of the attack, the violence of which is clearly established by the convulsions into which the viscera were thrown.

Professor Dick explains away, without apparent reason, the case of the bitch which died suddenly soon after eating a full meal. He says:—"The death of the bitch is a mere exceptional coincidence, and does not invalidate the opinion I have formed of the causes of the outbreak, and may be regarded as a case of colic, terminating fatally at the season it prevails, the tone of her system being reduced by nursing, and thus predisposing her to such an attack."

I consider that, by setting aside incidental links in the chain in the way just referred to, we diminish the chances of arriving at the required knowledge by inductive evidence. I believe that no hound could be in better health or less predisposed to disease than the bitch referred to, when I saw her a few days before her death, on the grass with her fine litter of fat puppies, she herself being in no degree reduced by the nursing.

In attributing the attack of the hounds to various supposed causes,—they are said to have been affected in degree according to age, constitution, &c. Neither of these assumptions were supported by facts. Many of the finest hounds in the pack were most violently affected, and, as to age, we have no report of the number of hounds out of different ages; but the greatest number of deaths occurred in three-year-old hounds, viz., 6; 4 hounds of two years old, 3 of one year, 1 of five, 2 of six, and 1 of seven; so that there is nothing to be deduced from the respective ages, certainly those animals in their prime were fatally affected to fully as great extent as the older and the newly entered young hounds.

As for comparing the case of these hounds with that of braxy in sheep, or of pigs dying from plethora, I can see no shadow of comparison in reality. Nor will the work the hounds did, and the hours they were out, in any way account for the result. Granting that the weather was close, there was no burst, no run—the hounds were in cover; and, looking at those I saw in health, I should judge that they were not wanting of such condition from exercise and good feeding as would make them fit to stand such a day's work in East-Lothian, in the third week of September, as we are informed they had.

To the above remarks, I may add that, however well satisfied Professor Dick may feel, that enough has been learnt to lead us to determine something for future guidance; I maintain that we have everything to learn except the fact of the disaster having occurred, of the fatal results, and that the same pack of hounds has been similarly attacked, though less in extent and degree on two former occasions, at the same season, and after hunting in the same covert and over the same country; and that all the knowledge yet acquired on the subject seems only just enough to show the requirement of persevering inquiry into the phenomena, in order to acquire a more thorough understanding of it—hitherto we have only seen consequences; causes, and all their relations are what we now have to learn.



*Hæmatoma Auris in the Dog.* By JOHN GAMGEE, Principal of the New Veterinary College, Edinburgh.

EVERY veterinary surgeon and sportsman knows that occasionally pointers, setters, retrievers, Newfoundlands, and all dogs with flapping ears, are liable to extensive swellings, which, unless properly treated, permanently disfigure the dog.

*Causes.*—I have noticed the disease to which I apply the name of hæmatoma auris in full-conditioned animals of all ages. It occurs more readily in young animals than in old, and is usually seen in those that are plethoric and have not as much exercise as they would require to keep them in perfect health. In one case the attack occurred in a large cross-bred watch-dog that had been suffering for some time from inveterate eczema or red mange. In another it appeared during the treatment of a dog for canker of both ears, and several weeks after one ear was cured, and the second one was nearly healed up, the symptoms of hæmatoma occurred in the ear which was still diseased. Many other cases have come under my notice, in which I could observe either a tendency to obesity or to swelling of the lymphatic glands, and chronic derangement of the skin.

*Symptoms.*—The animal is noticed to twist its head downwards towards the affected side. If inflammation of the ear or ulceration of the flap (canker) has existed for some time, this may be overlooked. The symptoms of distress and decided inconvenience afforded by the morbid condition of the ear lead to a closer examination, and the flap is found hot, painful, and much swollen. The swelling may be circumscribed and situated high up on the inside of the flap, or it may be diffuse and involve the whole of the inside of the flap. On manipulating the ear, it is found that the enlargement fluctuates, and it is evident enough that fluid is contained in it. If left alone the swelling enlarges and then becomes hard. In the course of time there is a reduction in size, but the ear remains disfigured. This happens also if a small opening is made to evacuate the contents of the tumor. I have never seen these swellings suppurate, and the disposition to resolution is slight. It is, therefore, most expedient not only to relieve the animal's sufferings, but also to prevent its permanent disfigurement.

This disease is not confined to the dog. It occasionally attacks the human subject. I have seen an instance of it in man, and recently attention has been drawn to the subject in the medical papers. Viborg has described the disease in the pig, and attributes it to bites.

*Nature of the disease.*—The malady consists in congestion of the plexus of vessels in the subcutaneous areolar tissue on the inside of the ear. Effusion of blood occurs, followed by a progressive transudation of serum, which is found usually of a red colour, and having a disposition to gelatinize on cooling. As much as two or three ounces of such serum may accumulate in chronic cases. The blood-vessels



becoming distended, a tendency to congestion is established; fibrinous clots form in the part, and unless the case is properly managed, the ear must remain deformed.

*Treatment.*—It is best to get the cases in the early stage of hæmatoma, when the swelling is still slight and confined to the upper part of the inside of the ear. A free incision then leads to discharge of blood and serum that has accumulated, and the animal recovers rapidly. In the event of the swelling attaining considerable dimensions, and remaining unmolested for some time, it is essential to remove from the sac, out of which fluid is discharged by a free incision, any coagulable lymph, and even loose connective tissue containing enlarged vessels, through which a very languid circulation occurs. On pressing the ear, after having opened it, and on pulling gently at the shreds of tissue which present themselves at the opening of the wound, the sac is easily cleared of all that might interfere with the proper healing of the parts. All that remains to be done usually consists in keeping the part clean, or applying a mild astringent lotion, containing sulphate or acetate of zinc, diacetate of lead, alum, or any such substance.

The animals must be treated constitutionally. They must be purged, put on moderate or low diet, exercised freely, and, in the event of their suffering from skin disease, or canker of the ear, they must be attended to for those conditions.



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### THE SALE OF DISEASED ANIMALS AS HUMAN FOOD.

IN the *Medical Times and Gazette* for the 20th of December, a paragraph appeared, referring to the sale of diseased cattle, and, after allusion to the extraordinary statement made by the largest salesman in Ireland, Mr Ganly, at a meeting of the Royal Dublin Society. the Editor says, "There is one consolation which the philosopher may extract from all this. If the consumption of diseased meat be so universal, it does not seem to hurt those who can get enough of it. The human stomach is a wonderful organ."

We must express a regret that such words should have been printed in a medical journal. Had the editor of a daily paper made such a statement, it might be passed over in silence; but, as unfortunately it is very difficult to impress upon the general public the great danger incurred from eating diseased meat, and on farmers and butchers the great criminality of selling diseased animals, we cannot but regard it as ill-advised that a medical editor should write in the above strain.

Unfortunately there is abundant evidence to show that diseased meat and milk are inflicting unsuspected but serious injury on those partaking of them. It is only a small per-centage of the individuals that die that are carried off by diseases regarded as most important by the physician and surgeon. In the same way, it is only a per-centage of people that contract disease from consuming the produce of diseased animals; but, since the subject has attracted attention, many facts have come out which demonstrate how ill-founded such a supposition is as that of the editor of the *Medical Times*.

It is a singular fact, that splenic apoplexy in cattle is spreading. It has appeared in the Three Kingdoms this year, and three veterinary surgeons report to the effect that pigs and dogs, eating the entrails or licking up the blood of animals slaughtered when affected with this disease, die. Many animals have been sold by the butchers in Edinburgh, Newcastle, London, Manchester, and Dublin that have died of



this disease; and we are glad to seize this opportunity to caution our professional brethren as to the advice they give in these cases, and we hope they will use all their influence to get the animals buried.

Black quarter, or malignant anthrax, has prevailed to a large extent; and we learn from Dr William Budd and other observers, that malignant pustule is by no means an uncommon disease in this country. Carbuncle is increasing in prevalence, and it is said by Dr Stark that there is an evident connection between that disease and the increasing sale of unwholesome meat. Dr Letheby has reported wholesale poisoning with fresh sausages made with the flesh of diseased cows; and we venture to think that, during the past year, many facts have been brought to light which indicate that our faith in the innocuous properties of diseased meat has been only based on blissful ignorance.

But let us turn to the German observers. Let us see what has been done of late years on the subject of parasitism. The most troublesome and the most dangerous parasites we owe to eating raw or underdone meat. The measly calf will give us *Tænia mediocannelata*. The 34,500 measly pigs from Ireland, not to speak of measly pigs reared in Scotland and England, as there are few in Britain, are capable of giving tapeworm to as many hundred people as there are measly pigs. It is of course very lucky that so many of the measles are roasted, but a very significant percentage of them get into the human intestines alive. In the absence of all statistics on this point, we can only make a guess, but we suspect, that of the 30,000,000 inhabitants in the British Islands, the number affected yearly with tapeworm will not be less than 15,000, one in two thousand individuals, or one for every other measly pig eaten. This allows for the destruction of at least 999 out of every 1000 cysticerci.

The researches on the cysto-cestoid worms have, however, been followed by very interesting observations on a very destructive parasite in the muscles of men and animals, the *Trichina spiralis*. The best British authority on this subject says, that two per cent. of the human beings dissected in the University of Edinburgh, indicate the presence of this dangerous parasite in their flesh. It is a parasite we get also from eating raw or underdone pork, and on this point recent investigations, by an eminent Continental veterinarian, Professor Haubner, are most conclusive.

The milk, again, secreted by diseased cows, has been supposed to be harmless, but facts have been pouring in to indicate its poisonous



properties, and one of the medical practitioners in Edinburgh is to draw attention to this very important matter.

If, then, on the surface it appears we suffer little from the sale of diseased food, it is evident that in reality we suffer much,—far more than medical men have supposed. There has been a tendency to regard all diseases as due to bad air and foul water, but we trust that due importance will be attached in future to the influence of diseased animal produce in the production of human disorders.

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### PHARMACEUTICAL NOTES.

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**HYDRASTIS CANADENSIS**, (*Orange root, Yellow root, Golden seal*). —This plant inhabits the rich woods throughout the United States. It is a low, perennial herb, sending up in early spring, from a thick and yellow, knotted, root-stock, a single radical leaf, and a simple hairy stem, which is two-leaved near the summit, and terminated by a flower. The stem varies in height from 6 to 12 inches. The leaves are rounded, heart-shaped, at the base 3-7 lobed, and when full grown in summer, from 4 to 9 inches in width. The flower is solitary, and of a greenish-white colour. The root is of a bright yellow colour, tortuous, rugged, with numerous long fibres. The fruit is a berry, red or crimson in colour, resembling the raspberry, and is formed of many fleshy, obovate achenia. Each achenium contains one or two seeds of a black colour, having a minute embryo at the base of a fleshy and oily albumen. It belongs to the natural order Ranunculaceæ of De Candolle and other botanists.

It flowers in April and May; they are short-lived, the petals falling off soon after their appearance.

Little is known as to the history of this plant, but it appears to have been employed from the earliest periods of time by the Indians as a dye, as well as a medicine. Silks, wool, and linen are dyed yellow, and, by adding indigo, a rich blue is produced.

When fresh, it possesses a strong narcotic odour, and an extremely bitter, somewhat opiate taste.

On analysis, it was found to contain *gum, albumen, starch, gallic acid, sugar, soluble and insoluble salts*, and a crystalline substance to which the name of *hydrastin* has been given. The following analysis is given by Tilden:—

Organic matter, . . . . .	89·168
Inorganic, . . . . .	10·832
	<hr/>
Total,	100·000



Gum, . . . . .	6.05
Albumen, . . . . .	5.22
Starch, . . . . .	5.04
Extractive, . . . . .	3.57
Sugar. . . . .	7.23
Fixed oil, . . . . .	2.88
Colouring matter, or yellow, bitter extractive, . . . . .	7.65
Particular matter, . . . . .	4.42
Resin, . . . . .	2.77
Soluble salts, . . . . .	2.53
Insoluble „ . . . . .	2.30
Lignin, &c., . . . . .	44.34
Total,	100.00

Hydrastin may be prepared by dissolving an aqueous extract of hydrastis in water, adding magnesia, and extracting the precipitate produced by boiling alcohol, allowing the solution to evaporate, when the hydrastin is obtained in beautiful yellow crystals.

Mr Parrish gives the following characteristics of the alkaloid, hydrastria:—“Brilliant yellow crystals, insoluble in water, sparingly soluble in cold alcohol and ether, soluble in chloroform and boiling alcohol, fusible in heated turpentine. It has an alkaline reaction on litmus; by concentrated nitric acid it is coloured deep red; concentrated sulphuric acid has little action when cold, but when heated, a purple colour is produced; concentrated muriatic acid dissolves it. Besides the alkaloid, there are three concentrated preparations in use—one is described as a resinoid, one as a resin, the other as a neutral.

Professor Waye gives the following mode of preparing hydrastin:—“Treat the powdered root of hydrastis canadensis by displacement with cold water; then acidulate the infusion with hydrochloric acid, which precipitates hydrastin and a gelatinous substance; collect the precipitate in a filter, and wash with clean water; then dry it, dissolve the dried mass in alcohol, filter, and set aside to crystallize.”

Dr Mahla, of Chicago, United States, has recently made the discovery, that hydrastin, thus prepared, is in reality impure bebeerine. Dr Bentley has carefully examined specimens of hydrastin, the chemical reactions of which correspond in most particulars with bebeerine, so that the presence of bebeerine in Hydrastis canadensis is clearly ascertained. The discovery of bebeerine in this plant is a most interesting one, as it has never before been found in plants belonging to the Ranunculaceæ.

Dr Bentley is of opinion that further experiments are desirable, before we can have an altogether satisfactory knowledge of the principles contained in Hydrastis canadensis, but so far as he has had an opportunity of examining the different kinds of hydrastin, he is of opinion that bebeerine is associated with a peculiar principle in the hydrastis. As a medical agent it is held in high repute as a tonic, and is said to act upon the hepatic function as a chologogue, and upon the glandular system generally as a deobstruent.

Lee says that the resinoid extract, obtained by the solvent action of



alcohol, differs essentially in its effects from the alkaloid hydrastrina, proving highly irritating and stimulating, while the latter acts chiefly as a simple tonic. In inflammatory or irritable conditions of the gastro-enteritic surfaces, the former preparation will therefore be found objectionable. It has been employed in atonic dyspepsia, scrofulous and chronic cutaneous affections, in chlorotic amenorrhea, constipation, catarrh, gleet, &c. &c. It is given in the form of decoction, tincture, extract, &c. The average dose of hydrastin is from 1 to 6 grains. Dr Coe recommends the following for leucorrhœa, when the secretions are acrid and offensive:—℞ Hydrastin, ℥i; super carbonate of soda, ℥i; dose, 4 to 8 grains three times a-day.

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GELSEMINUM SEMPERVIRENS, (*Yellow Jessamine, Wild Jessamine, Woodbine*).—This plant is found in the Southern States of America, on the banks of rivers, and near the sea coast.

It belongs to the natural order, Scrophularia (the Figwort order). The average length of the root is 15 feet. The stem, from 20 to 30 feet long, is smooth, and twines to the top of the trees on which it fastens. The leaves are smooth, and of a beautiful deep-green colour. The flowers are yellow, and possess an agreeable odour, resembling jessamine. The fruit is a berry, which, when ripe, is of a black colour.

It is extensively cultivated as an ornamental plant in the Southern States, on account of its deep-green coloured leaves and beautiful yellow flowers. The root is the part principally employed in medicine.

There are many conflicting opinions regarding the medical actions of this drug. With some it is held in high repute, whilst others will not be induced to give it a trial.

It has been given in inflammation of the brain, pneumonia, pleurisy, acute rheumatism, convulsions, with satisfactory results. In gonorrhœa, it has been used with success. Its action on the nervous system is very marked, producing giddiness, dilatation of the pupils, and occasions in large doses a disturbed vision, or double vision, accompanied with complete relaxation of the muscular system, without nausea or vomiting rapidly diminishing the circulation.

In yellow fever, it has been employed, and not without satisfactory results. With a view of testing its efficacy, Drs White and Ford selected an equal number of cases for trial. Of those treated with the old plan of calomel, &c., one-half recovered; of those treated with veratrum, one-third recovered; of those treated with gelseminum, all recovered.<sup>1</sup>

It is generally used in the form of tincture—dose from 10 to 20 drops. In cases of poisoning, the best antidotes are ammonia, brandy, &c.

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<sup>1</sup> *American Journal*, vol. i. p. 247.



**APIOL.**—In the year 1849, the Society of Pharmacy of Paris proposed for competition the following inquiry:—To discover a means of artificially preparing Quinine, that is, without the employment of Cinchona Bark, or any substance containing quinine ready formed. In default of this, to make known a new organic product, natural or artificial, possessing [medicinal] properties equivalent to quinine, and which would be capable of competing commercially with it.

Nine memoirs, professing to reply to this inquiry, were addressed to the Society, among the number being one by Drs Joret and Homolle, upon an alleged new febrifuge named by them *Apiol*. This memoir, although not completely resolving the question, and consequently not deemed worthy of the prize, was yet considered to deserve special encouragement, and an abstract of it, prepared by M. Dubail, appeared in the *Journal de Pharmacie et de Chimie*.<sup>1</sup> From this abstract and from MM. Joret and Homolle's *Mémoire sur l'Apiol* (Paris, V. Masson, 1855, 8vo), we gather the following facts:—

That the febrifuge virtues of certain European umbelliferous plants, such as *Smyrniium Olusatrum* L., *Imperatoria Ostruthium* L., *Apium graveolens* L., *Phellandrium aquaticum* L., &c., have from time to time attracted the notice of physicians, and that even the juice and other preparation of common parsley (*Apium Petroselinum* L.) have been employed in cases of fever with more or less success. It was not, however, until the year 1847, that an accidental circumstance induced one of the authors to make some experiments upon the seeds of the last-named plant, which experiments proved eminently encouraging. This led to a chemical examination, the results of which may be thus stated. Parsley seeds contain:—

1. A volatile oil.
2. A crystallizable solid fatty substance, fusible at 73° F.
3. Pectine (the *apiine* of Braconnot).
4. Chlorophyll.
5. Tannin, yellow colouring matter, extractive, woody matter, and inorganic salts.

6. A yellow, oily, non-volatile liquid, denser than water, having a peculiar taste and smell. This liquid, to which the name of *apiol* was given, was determined to be the principle to which exclusively the antiperiodic virtues of the seeds are due.

The method recommended for the preparation of *apiol* is the following:—Powdered parsley seeds are to be exhausted with alcohol of sp. gr. 890 to 864; the tincture obtained is to be treated with animal charcoal and then evaporated in a water-bath until three-fourths of the alcohol have been recovered. The residue is to be treated with ether or chloroform, and the solution so obtained is to be evaporated (finally by a stove heat) until all trace of either menstruum has been expelled. A liquid remains which is to be triturated with an eighth of its weight of litharge, and then allowed to subside during forty-

<sup>1</sup> Tome xxviii. (1855), p. 212.



eight hours. Finally it is to be filtered through a thin layer of charcoal, which will render it nearly colourless. The product so obtained is called *apiol*.

In this state *apiol* possesses the following properties; it has the peculiar and tenacious odour of parsley seeds, but not the terebinthinous smell of the essential oil; it has an acrid and pungent taste, especially felt in the fauces. Its density at 53° F. is 1.078; at 10° F. it becomes turbid, but without solidifying, regaining its transparency upon an elevation of temperature. Heated to a temperature of from 300° to 350° F. it disengages some bubbles; at 428° F. it becomes coloured without apparently any modification in odour or taste, and without loss in weight; it is therefore not volatile. Burned upon a platinum slip, it leaves no fixed residue. It is insoluble in water, whether cold or hot, very soluble in alcohol of sp. gr. .934 to .834, and dissolves in all proportions in ether or chloroform. Chlorine does not sensibly alter either the odour or taste of *apiol*, but it produces in it a slight blackish precipitate. Potassium immersed in it, rapidly becomes covered with bubbles and disintegrates, indicating the presence of oxygen. *Apiol* contains no nitrogen. Treated with sulphuric acid, it behaves like *copaiba*, acquiring a beautiful red colour, and solidifying with the loss of both odour and taste; it decomposes nitric acid violently, becoming converted into a yellowish resin. It has no action upon hydrochloric acid, but is completely soluble in acetic acid. It forms an emulsion with potash or soda; an ammoniacal emulsion exposed to the air loses its ammonia, the *apiol* regaining its original condition. An alcoholic solution of *apiol* slightly reddens litmus and syrup of violets. The same solution treated with an alcoholic solution of acetate of lead becomes turbid, the turbidity disappearing upon heating, and reappearing as the liquid cools.

Drs Joret and Homolle, says M. Dubail, consider that *apiol* is an immediate principle, allied in its nature to fixed oils. In its density it differs from analogous organic products; while most of the reactions which it produces with reagents are (with the exception of that with acetate of lead) purely negative.

*Apiol* is recommended as a powerful febrifuge; it may be administered in doses of five or six drops (two and a-half or three grains) diffused through any bland liquid,<sup>1</sup> or in the form of capsules, four of which contain one gramme or fifteen and a-half grains. In cases of intermittent fever, two to four capsules may be given daily in one dose five or six hours before the paroxysm. *Apiol* may also be prescribed in the form of a syrup prepared thus:—*Apiol* five parts, white sugar a thousand parts. Mix together and dissolve with a gentle heat in distilled water five hundred parts; filter and preserve for use.

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<sup>1</sup> The following is a good formula:—R. *Apiol* gr. v. Syrupi f3ij. Pulv. tragacanth co.. Dj. Aq. dest. ad f3xx. Misc. [Each fluid ounce will contain two grains of *Apiol*.—Ed. *Ph. J.*]



Of this syrup two and a-half fluid ounces contain only five grains: hence the necessity of a larger dose of sugar than would often be convenient.

According to Drs Joret and Homolle, apiol has also been usefully employed as an emmenagogue in doses of three to five grains *per diem*, and has likewise proved beneficial in the night perspirations of phthisis.—*Pharmaceutical Journal*, Dec. 4, 1861.

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## MEETING OF A SOCIETY.

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### ROYAL DUBLIN SOCIETY.

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THE Society met on Saturday evening last, in their Rooms, Kildare Street, at eight o'clock. There was a large attendance of members.

Lord TALBOT DE MALAHIDE in the chair.

A highly interesting paper was read by Professor GAMGEE, Principal of the New Veterinary College, Edinburgh, which appears in another part of this number of the *Review*.

At the conclusion of the reading of the paper the learned professor was warmly applauded.

The noble Chairman said it was impossible to overrate the importance of the subject, or bestow too much praise on the ability with which it had been treated. He took a great interest in the rearing of stock, and therefore hoped that those gentlemen who were acquainted with the subject would favour the meeting with the results of their experience, and he was sure Professor Gamgee would be ready to answer any questions put to him.

Mr GANLY, salesmaster, said that beyond all doubt the disease called pleuro-pneumonia existed to a very large extent in Ireland, and the great question was how to prevent it. He would take that public opportunity to say, that unless some means were devised to give compensation to the farmer for his diseased stock, it was impossible to prevent him from selling them, or the butcher from buying them or killing them. Unless some society or some organization were devised for the prevention of the spread of disease by purchasing the diseased animals, diseased meat would be sold, and bought, and killed, and eaten. As there was no use in mincing the matter, he would say for himself and his brother salesmen, that every one of them sold diseased cattle, and under existing circumstances they must continue to do so. The farmer had no remedy; he should sell his unsound cattle as well as his sound stock, to enable him to pay his rent; for the disease was so prevalent that he could not live were he to submit his cattle to destruction without some payment for it. Some one might ask why did not the Corporation prevent this state of things. His answer was that the Corporation could not prevent it; and so long as there was no remedy offered, they would be obliged to sell diseased stock, and the butcher would buy them.



The Hon. JOHN P. VERIKER, Lord Mayor Elect, said that he thought this country laboured under a great disadvantage in not having spread over it a number of men of Professor Gamgee's ability and experience, by whose aid our farmers would be enabled to deal with the fearful malady which is now committing so much devastation amongst their stock. He thought that the subject of compensation for diseased stock should be approached with great caution, so that it would be the farmer's interest to prevent the spread of disease, and the producer was bound to submit to the loss, more especially if he were negligent in guarding against disease. The legislature was bound to prevent the extension of disease, and, in case a great loss should fall on the owner of stock, it would be proper that some compensation should be made to him. The Lord Mayor had power to seize diseased meat exposed for sale, and he sometimes sent large quantities to the Zoological Gardens; but it was very difficult to find diseased meat, inasmuch as it was seldom exposed in open market, but was generally cut up in small pieces, pickled, and salted, and made into sausages. But the law was so very defective that if the Lord Mayor saw diseased cattle intended for human food, and no matter how certain he was that it would spread infection over the city, he had no general power to seize it so long as the animals were alive. He thought Professor Gamgee's paper was most important, and if it were properly considered it could not fail to lead to some useful legislation.

Mr JAS. HAUGHTON said that the paper should be deeply interesting to his carnivorous friends; but he thought they might not be so much concerned about the matter were they to become vegetarians, as he had several years ago, without having any reason to regret the change. It was said that Ireland was peculiarly fitted for the production of cattle, but his opinion was that if proprietors were to direct their attention more to the cultivation of corn, both they and the country would be far better off. They had difficulty at present in sustaining the population of the country, and if agriculturists were to care less for the production of cattle, and more for the production of corn, they would enable the country to support at least three times its present population.

Mr CHARLES WILLIAM HAMILTON could not omit the opportunity of expressing his conviction of the great service which Professor Gamgee has rendered to them all by the address which had just been delivered. The picture which the learned Professor had drawn, though frightful indeed, was not by any means overdrawn, as he could bear testimony to the difficulty experienced in arriving at the facts in such cases, where it appeared to be the farmer's interest to keep back information as to the real condition of his stock. The ravages committed by the disease might be inferred from the circumstance of the diminished numbers of animals which appear in the great metropolitan market, notwithstanding the increase of population and the considerable importations of stock from the Continent. Comparing the returns for the years 1853 and 1861 there was a falling



off in the number of cattle of 10,045 head; and of sheep the falling off, between 1851 and 1861, was 170,525; although the metropolis had, in the interim, increased one-fifth. But when we take into account that this decrease is co-existent with a wonderful improvement in the rearing of stock, as regards early maturity, the diminution in the live-stock of the country will appear still more frightful. As a consequence of this state of affairs the prices of butchers' meat have very much increased of late. In the last ten years the rise in the price of beef has been from 3s. 8d. to 4s. 10d., and of mutton from 4s. 2d. to 5s. 8d. per 8lbs. These were startling facts in connection with the able statement which they had from Professor Gamgee, and they were surely such as could not fail to lead to energetic action to arrest the evil which had now become of such appalling magnitude.

Dr CAMERON thought very highly of Professor Gamgee's paper, but he trusted the Professor would give something like a solution to the difficulties which he had pointed out. The Professor argued that the disease was always contagious, never spontaneous, and if this were the case how was it that it had broken out in Australia a few years ago? He knew of the existence of the disease in the Island of Man, where, for two years previously, no stock had been imported from the mainland. Professor Gamgee's paper was very valuable, and by it he had rendered a great service to agriculturists.

Mr BALDWIN, though bearing testimony to the very able manner in which the subject had been treated, was of opinion that the estimate of Professor Gamgee as to the extent of the mortality was considerably overdrawn, as compared with the results of his experience; and he was not by any means satisfied of the soundness of the opinion that the disease could be in every case traced to contagion. He had a good opportunity of studying this disease; and he was bound to say that he had met cases which, in his opinion, could not have been produced by contagion or infection. A young animal reared on a piece of grass-land detached from the remaining portion of the Model Farm, was put up to fatten with a lot of other beasts about two months ago. It so happened that from his study he could hear the animals coughing. About six weeks after the animals were put into the stalls he had heard one of them cough; it was the peculiar cough so characteristic of this disease. From that moment he watched the animal; it soon became evident that she was suffering from pleuro-pneumonia. The animal being sold to a butcher in Dublin, he forwarded her to the slaughter-house, and a clearer case of hepatized lung he never saw. He must express his conviction that Mr Gamgee's statistics exaggerated the prevalence of disease in Ireland. That disease existed among our live-stock to a serious extent was but too true; but all the evidence which came before him goes to show that it does not prevail to the extent stated by Mr Gamgee. For the present we cannot discuss Mr Gamgee's statistics. Mr Gamgee had given a very high average percentage of disease for



an island; he had told them also that Meath was the plague-spot of the island. Now, he (Mr B.) had visited many parts of Meath. He had recently spent a day with a salesmaster who grazes vast tracts in that county. He was one of the salesmasters of Dublin. That gentleman gives as the result of his great experience, and of his honest convictions, that the losses experienced from pleuro-pneumonia by the farmers and graziers of his acquaintance does not exceed five per cent. on the difference between the purchase and selling price of the stock.

Professor FERGUSON, veterinary surgeon, said that in 1841 he had been of opinion that the disease was neither infectious nor contagious, but, from reliable statistical information, he had since been forced to come to the conclusion that it was both; but its being so was not proof that the disease could not take place spontaneously as the simple result of atmospheric influence; for, from extensive observation and a careful study of the malady, his firm opinion was, that it was capable of being introduced by atmospheric influence alone. He knew of many instances of the disease amongst cattle which were kept in the most isolated fields. As to the remark made by the Lord Mayor Elect, respecting the deficiency of veterinary knowledge in this country, he hoped his Caledonian friend would not be displeased with him if he contended that although there were no veterinary schools here, there were as much facilities for medical education in this country as in any portion of her Majesty's dominions, and he would add that those gentlemen who practised veterinary surgery here were as well qualified as those in either England or Scotland, although they had to go to those countries for the cultivation of the science. In conclusion, it was his firm conviction that were such measures taken as those recommended by Professor Gamgee, they would decidedly diminish the disease, but they could not entirely annihilate it.

Professor GAMGEE said, that at that late hour he would not detain the meeting long, and he wished to state that he was prepared to demonstrate that in ninety-nine cases out of a hundred pleuro-pneumonia could be traced to infection or contagion. The strong opinions which he entertained were not the result of inquiries over a limited area, or into a few individual cases of disease. His inquiries extended over not only the whole of the United Kingdom, but also included the greater part of the Continent of Europe; and he was fully justified in stating that there was scarcely a veterinarian of eminence, who had paid special attention to the progress of pleuro-pneumonia, who was not thoroughly satisfied as to the highly contagious character of the disease. He might refer to many instances in his own practice in Scotland, where attention to his directions as to preventive measures had been the means of saving complete herds, while neglect of the proper precautions had in other cases led to wholesale destruction. Again and again had an entire stock been lost by the purchase of a single beast from a dealer; and so well fortified was he in his opinions on the subject by the distribution of the disease



throughout Scotland, that he had no difficulty at any time in pointing out the districts from which stock might be procured with the most perfect impunity. He could mention instances, such as in the famous case of the existence of small-pox in sheep in Wiltshire, where numbers of them were kept in fields far distant from the high roads, apparently removed from the danger of contagion; yet, when the matter was inquired into, it was found that those fields in which they were kept lay on driftways, along which diseased sheep were driven for the purpose of evading the tolls on the high roads. He showed that he was right in his views by the facts that in England and Scotland the contagionists succeeded in their treatment of diseased cattle, while non-contagionists failed. The disease owed its existence in Australia to the importation of stock from Holland, and America suffered by importations from England. He was asked for a remedy for the evil. It would be premature to offer one, and it would be folly in him in a few minutes to attempt such a thing, which must be left for a future occasion. He should, however, express his thanks to Mr Ganly for the manner in which he supported his (the Professor's) views, and for his statements, founded on a large experience. He felt that the few words Mr Ganly had spoken that evening were of the greatest importance, for he wanted a confession from gentlemen of Mr Ganly's class. Mr Ganly spoke in accordance with the views which foreign governments held on these subjects, when he said that it was impossible to prevent the evil unless farmers were in some way compensated for their diseased stock, while there was a great deal of truth in what the Lord Mayor Elect said, that a premium should not be put upon diseased cattle. The farmers had now to sustain losses, and, of course, they should have still to sustain them, even in cases of legislation for the prevention of disease. Scientific skill and judgment were required, and instead of having a lot of veterinary surgeons drugging and blistering, and so on, he wished for the application of science to prevent the disease by the inspection of stock, the separation of the sound from the unsound in the earliest stage, and the destruction of the latter. He would impress on them the importance of the subject, and the necessity for inquiry, which must be the prelude to the adoption of vigorous measures for combating the evil from which the country was now so severely suffering.

Lord TALBOT DE MALAHIDE proposed a vote of thanks to Professor Gamgee for the valuable information which he imparted to them that evening. He (the noble chairman) fully agreed with Professor Gamgee as to the importance of the subject, and the expediency of devising some remedy for the prevention of the disease of which he had so fully and ably treated. He thought that the adoption of a system of mutual insurance would be of great advantage in providing for the losses sustained by diseased cattle, and that strong measures should be taken for the destruction of the latter.

The vote of thanks was carried by acclamation. The proceedings then terminated.



## PERISCOPE.

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### OBSERVATIONS ON THE LATE SUDDEN AND FATAL ATTACK OF DISEASE AMONG THE EAST-LOTHIAN FOX-HOUNDS.

*(To the Editor of the North British Agriculturist, Dec. 10).*

EDINBURGH VETERINARY COLLEGE,  
8, CLYDE STREET, 8th December, 1862.

SIR,—On Tuesday the 23rd September last, I received a telegram from Sir David Baird to visit the East-Lothian Kennel, West Salton, where a sudden and violent attack of disease had occurred among the fox-hounds, of which several of them had died. Being from home when the message arrived, and having a professional pre-engagement on the following day, it was not in my power to make out my visit until Thursday the 25th.

On my arrival I learned from the huntsman (an intelligent and experienced man in his department) that the pack had had a hard day's work—cub hunting in covert—on the previous Saturday, the 28th September, and had drank freely from two small ponds, out of which cattle are accustomed to drink. The pack was fed as usual on their return, all the dogs being apparently in good health, and that every one of them, at varying intervals, from the time of the second feeding next morning, commencing within six and seven hours afterwards, up to twenty hours, had been more or less violently seized with severe symptoms of disease, the more prominent of which were spasms, vomiting, and purging, and that death had supervened at different periods. I found almost the whole pack in a state of prostration, exhaustion having succeeded the primary violent evacuations from the stomach and bowels, and general convulsions. The therapeutic treatment which I recommended was the employment of an anodyne—laudanum and oil—and restoratives, with external frictions and fomentations. I examined the viscera of several of the dogs which had died. The internal or lining membrane of the stomach was highly inflamed, as well as that of the intestines, through their whole course, and especially in the jejunum, where intussusception had taken place, although invagination of the gut, I believe, is usually found in the colon after morbidly increased peristaltic action. The inflammatory process had permeated from the serous membrane, the whole intestinal coats of which appeared in a state approaching to mortification. The extensor muscles of the legs were in a rigid condition. Such a sudden and fatal attack of disease, with its accompanying symptomatology, naturally suggested an irritant poison as a probable exciting cause. I accordingly ordered the contents of the stomach and intestines of one of the dogs which had died, as well as its viscera, to be placed in a jar, which I brought along with me to Edinburgh for examination and analysis. The whole carcase of another dog was subsequently sent to me for the same purpose, and a relative report was drawn up, which I annex, by Dr Murray Thomson, Lecturer on Chemistry. The cuticle of that dog, when skinned, was found—a fact deserving to be noticed—to be highly erythematous.

Not having had an opportunity of attending to the disease in its early stages, and desirous of obtaining information as to the progressive development of the symptoms, and of receiving the fullest particulars as to their alleged cause and origin, I addressed a letter to the huntsman on these points, and received the following answer :—

“ THE KENNELS, WEST SALTON,  
30th Sept., 1862.

“ Sir,—In reply, I beg to inform you that I fed the hounds on Sunday the 21st, at half-past nine in the morning. All the hounds were fed on the same kind of food, and at the same time, and they fed as well as usual. At four o'clock in the afternoon, I was walking them out on the grass, and three of the hounds I saw were very unwell; one of them in particular was lying on his belly with his legs



stretched out quite stiff. I gave them castor-oil immediately; all the others seemed quite well. I was up at five o'clock on Wednesday morning, and when I went into the kennel, not one of the hounds could move—all were convulsed and twitching—not one could touch food that day. The first bitch died at three o'clock in the afternoon, the second at half-past four. The inside of every hound that died was in the same state as the one was which you saw. We have lost nine couple, and there is another couple that I have but little hope of. I have sent you a hound that I found dead in the yard this morning. She had not been hunted this season. She fed well yesterday afternoon at four o'clock. Instead of taking her out on the grass with the other hounds, I turned her into the large yard, where the others have been; and whether she picked up anything or not I don't know. The hind part of her, where you see the hair is off, was done when she was out with her puppies. I should like you to analyze her well. I am very anxious to know what was the cause of her death. I shall send her to you by the train this afternoon, sealed the same as this letter. I must tell you, that of the three hounds I gave the castor-oil to, two of them recovered.—I am, Sir, your obedient servant,

(Signed)

"JOHN ATKINSON."

"To Professor DICK, Edinr. Veterinary College."

The following letter was sent by me to Mr Aitkinson, soliciting further information.

"EDINBURGH VETERINARY COLLEGE,  
22nd October, 1862.

"Sir,—I duly received yours of the 30th Sept., and have delayed writing to you until the analytic report on the contents of the dog's stomach and intestines was drawn up. Nothing poisonous has been found. You will confer an additional favour by supplying me with replies to the following interrogatories. I understand the dogs were taken out on Saturday morning, the 20th ult., at 6 A.M., and did not get home till 1 P.M.; is that correct? When were they fed after getting home? and what was their food? Did they seem quite well on Saturday night? Was there any change in their food? How many hounds were taken out? and whether were they hunted for a longer or shorter period than usual? What were the ages of the dogs? What was the number of the respective deaths among the old and young dogs, as well as the proportion between the dogs and bitches that died? How many have altogether died? What was the intervals between their deaths? Have the dogs in your kennel at any time been seized with similar attacks, and if so, how many died? Under what circumstances have the dogs been affected, whether in the hunting or close season? What is the difference in their food when hunting or not hunting? Have the dogs which recovered been able to be hunted? How long after their attacks were the dogs able to be taken to cover? You will oblige me by sending me full particulars to these questions, as I purpose drawing up a professional paper on so interesting, important, and instructive a subject.—I am, Sir, your obedient servant,

(Signed)

WILLIAM DICK.

To Mr ATKINSON, Huntsman to the

"East Lothian Hounds, West Salton."

I enclosed to Sir David Baird a copy of the preceding letter, when I transmitted to him by post on the 8th November the medical and analytical report drawn up by Dr Murray Thomson, with a request that he would be so obliging as to procure the information I was so desirous of obtaining, and which the following communication so fully supplies:—

"GILMERTON, by DREM, Nov. 15, 1862.

"SIR,—Sir David Baird has been very busy for some time past, and has not been able to attend to your letter of the 8th instant; not being at all well, and feeling anxious that you should not have to wait any longer for an answer to your questions, he has begged me to write to you in reply. You will remember that I answered a number of questions which you put to me one day I called on you in Clyde Street early in October. I will now take the questions you put to the huntsman, and answer them *seriatim*.



"The hounds must have left their kennel soon after 4 A.M. on the Saturday morning. They were thrown into covert at 6 A.M., and were hard at work till 1 P.M. They did not get home before 3 P.M. They were not fed till they had been home for an hour and a-half. Their food was the customary porridge and milk, with some flesh added. The porridge or puddings being made half of oatmeal, and half of Indian corn. They were quite well on Saturday night. The food described above is their usual food during the hunting season. When not hunting the porridge is thinner, and more milk is given. There were twenty-eight couple out. It was a long day for an opening day, and the weather was intensely hot. The dogs' ages were from seven to one year old. The ages of the hounds that died were—

Dog.	Years old.
1	7
2	6
1	5
2	4
6	3
4	2
3	1

—  
No. of dogs that died, 19

Five dogs and thirteen bitches died. The first death was on Monday afternoon. By Wednesday morning there were five or six couple dead. The rest lingered on for ten days longer, the last case occurring on the fifteenth day. The one-year-old hounds lasted the longest, and at first did not appear to be very seriously ill. The hounds have twice been taken with similar symptoms, in each case after hunting in the same covert, *always* early in the season, *never* as the season went on, but never so badly as in the present outbreak. On one occasion Mr Fletcher lost three hounds out of ten couple affected. Last year several hounds were ill after hunting there, but none died. When hunting, the porridge is thicker than it is when the hounds are off work. All the hounds are now in good work again. They were out in three weeks' time after being seized. I hope these answers will be useful to you. Should you require further information on any point, I shall be happy to supply it.—Yours faithfully,

ALEX. KINLOCH.

"To Professor DICK,  
Veterinary College, Clyde Street, Edinburgh."

The following report comprises the morbid appearances and chemical analysis:—

"CHEMICAL LABORATORY, 8, Infirmary Street,  
EDINBURGH, Oct. 15th, 1862.

DEAR SIR,—I have now to report that on the 27th ult. (September), I received from your hands a covered jar containing the following organs of a dog:—The stomach, intestines, spleen, liver and two kidneys, and also at the same time a quart bottle of water.

After I had removed the above to my laboratory I proceeded to examine the viscera, and have to record the following appearances—1st, the stomach was much inflated, its contents, besides the distending air, being about a dessert-spoonful of greyish gruel-like fluid. The outside coat of the stomach had a greenish colour and partially decomposed aspect; the mucous surface was generally dark green, with here and there dark red patches and streaks, especially toward the pyloric end. The veins of the stomach were much distended.

II. The intestine was much injected on its serous surface, the vascular state of the mucous surface also betokened inflammation. About two feet below the pylorus there occurred on the intestine a most important lesion in the shape of an intussusception. The invaginated portion of bowel being about fifteen inches long, both the outer and inner parts, and especially the latter, were quite gangrenous.

III. The liver was emphysematous, no doubt partly from decomposition, its



depending borders were black, also from the same cause; in other respects this organ looked healthy.

IV. The spleen was dark in colour, but it did not present any other unusual appearance.

V. The kidneys were much congested, the outer coat being easy to separate. The cortical portion was soft and brittle; this latter appearance, however, may be accounted for by incipient putrefaction.

The chemical examination was next proceeded with. The cause of death you had reason to suspect was a poisonous dose of strychnia, and my examination, therefore, had special reference to this poison; but after looking for it, I also searched for prussic acid, coniine (hemlock), and the poisonous metals. The water in the quart bottle was first dealt with. It contained abundance of a green confervoid sediment, but the tests for strychnine gave a negative result.

A separate examination of the contents of the stomach, the stomach itself, the intestine, spleen, liver, and kidneys, resulted in showing the absence of strychnine. The process made use of was the well-known one of Stas. A second attempt to detect this poison was made on the stomach, liver, and kidneys, using this time a modification of Stas' process, and which is reported to be a little more delicate. It was not, however, more successful in showing the presence of strychnia. It should be noted that very small quantities of strychnine, *e. g.*, the eighth part of a grain, when distributed through a large quantity of animal matter, cannot be detected by the above processes. Parts of the stomach, liver, intestine, and kidney, were then tested for arsenic, mercury, lead, and the other poisonous metals, but none of these were present.

A search was then made on the stomach and intestine for prussic acid and coniine, the poison of the hemlock, but an entire negative result was got.

I have also to report to you the results of my examination of the second dog, which you told me had died seven days after the first one. Its viscera I took away from the Veterinary College on October 2nd, the organs which I examined being the stomach, intestine, liver, heart, and kidneys. The examination was conducted with the assistance of Dr Peter Young.

I. The stomach was found distended with food, which consisted of masses of undigested porridge. The serous coat was moderately vascular. The greater part of the mucous coat was healthy, but there were congested portions near the pyloric end.

II. The intestine, chiefly duodenum, serous coat was very vascular, while the mucous one was only faintly congested. The contents were a thin greyish fluid.

III. The liver was emphysematous and slightly congested.

IV. The heart was moderately contracted, the left ventricles especially. There was about a tea-spoonful of blood, dark and coagulated in each ventricle.

V. The kidney was very vascular, the serous covering easy to remove, the corticle substance very soft. The kidney was the organ which in this animal was most abnormal in appearance.

The chemical examination was then proceeded with, precisely in the mode pursued with those of the first dog. Strychnine was again made the subject of special search, likewise the testing for the poisonous metals was also pursued. None of the processes, however, revealed the slightest evidence of the existence of poison in any of the organs examined.

In concluding this report, I have simply to remark that the chemical examination does not throw any light on the death of these animals, nor on the morbid appearances which their organs were found to present.—I am, dear Sir, yours very faithfully,

MURRAY THOMSON, M.D., F.C.S.,  
Lecturer on Chemistry, E. M. School.

“Professor DICK, Veterinary College.”

“The preceding report proves the absence of any poisonous material, either in the contents of the stomach and intestines, or in the structure of the other viscera, from absorption, which were examined. The prominent symptoms of the disease



were vomiting and purging—the effect of the highly-inflammatory action which had taken place in the former organs; but no vegetable or mineral poison known as such having been found, the cause of that inflammatory action must be traced elsewhere. The appearances found upon dissection clearly showed the seat and nature of the disease of which the dogs had died, which were distinctly shown in the acute inflammatory process, which had extended over the whole course of the stomach and intestinal canal, involving all their coats, especially their serous membrane. But none of the morbid symptoms were either connected with or dependent upon the presence of any single virulent or irritant poison. To comprehend the true nature of the affection, its history must not be confined to a single view-point, but all the circumstances bearing upon it must be taken into cumulative consideration. And the division of the causes of a disease into proximate, remote, predisposing, and exciting, which the old medical pathologists followed, may not be inappropriately adopted on the present occasion. Now, what was the real state in which the dogs were placed relative to this fatal outbreak? The outbreak occurred at the commencement of the hunting season, before the dogs had been accustomed to work—a circumstance Mr Kinloch refers to, in similar attacks of previous years, although in a much milder form. The dogs had a very fatiguing day's work, and had drank, when heated, freely of cold water. The day was very close and sultry. And the season of the year was the autumn, when attacks of bowel complaints in the forms of colic and cholera usually prevail in a mitigated or more violent type, according to existing atmospheric influences. In my opinion, the co-operation of all these combined causes can satisfactorily account for the whole pack being seized not long after the second feeding. Their strength was tried by a hard day's work, to which they had not been seasoned, which may be called the remote cause, and the vigour of the digestive organs would thereby be impaired to a corresponding degree; the predisposing cause was the season of the year—a coincident one—what Sydenham calls the constitution of the atmosphere; the proximate cause was the susceptibility of the digestive organs to functional excitement; while the exciting cause was the food, which acted as a morbid irritant in the impaired functional state of the digestive organs. In accordance with this view, the appearances upon dissection were such as might be expected to have been found. It is well known that the same appearances present themselves in pigs which have died after being overfed. The stomach is found impacted with food, which acts as an irritant poison, causing inflammation of the stomach and intestines, and the cuticle is in the erythematous condition, which I found in the carcase of one of the dogs I examined. Braxy in sheep affords an analogous example of the violent inflammatory action in the intestines produced by articles of natural food, when taken under peculiar conditions and in large quantities. This very unmanageable disease is well known to commit its ravages towards the end of autumn, when the hogs, accustomed to the dry and withered herbage of the past season are turned on rank aftermaths or secondary growth of grass in sheltered situations, and young heather, which they are fond of, and greedily devour; and when an outbreak of disease among them occurs as speedily and fatally as the one in the East-Lothian kennel, on the dogs being first hunted for the season, having prolonged fatigue in a sultry day, and dieted with a mixture of animal food to which they had not been accustomed, until they are put to work, the morbid appearances after death being the same in both. *Up to the time of the second feeding, all the hounds seemed to be in a healthy state, and symptoms of disease only supervened after the digestive functions had been excited into action by the presence of food, not many hours after it was swallowed, while every dog became similarly affected in a longer or shorter time, all being at the same time exposed to the same exciting cause, the period and virulence of the attack being modified by age, strength, constitution, &c.* This explanation as to the *modus operandi* of the food exciting inflammatory action, may be objected to on the ground that no bad effects resulted from feeding on the previous afternoon, after the dogs had returned from their severe day's work in covert. But it must be remembered that food which, in ordinary circumstances, acts as a natural and healthy stimu-



lant to excite the digestive organs to increased action, is not analogous in its operation to an acrid or virulent poison, which manifests its morbid action generally in a very short period of time after being swallowed, the class of deleterious poisons operates as a fixed rule violently and speedily, although even arsenic has been known to lie dormant for an unusually long period in the stomach, before producing fatal effects ascertained by dissection after death, when the poison was detected by analysis. But it is an admitted fact that the poisons referred to very soon produce pain and vomiting when taken into the stomach, modified to some degree by the amount of food with which that organ may be charged, but there is no instance on record of the appetite remaining unimpaired upwards of twelve hours after the administration of an acrid deadly poison. It is therefore beyond dispute that there was no poison in the food given to the dogs on the Saturday evening, which was their first feeding, nor in the food they next got on the following morning, as none was found after death upon careful chemical analysis. If the first meal taken after the dogs returned from a long and fatiguing day's hunt proved innocuous, it may naturally be asked, why should fatal results have arisen from the second meal. I have stated that the outbreak must be viewed in all its bearings to the series of the combined co-operating causes. The re-action after fatigue not only does not immediately follow, but usually takes place at a period more or less remote from the time of collapse.

And I can account in no other way for a whole pack of hounds being seized within 24 hours after being fed the second time, under the circumstances to which they had been exposed on the previous day, and without any new or additional cause of disordered or deranged functions, than on the supposition that a morbid action had superinduced slowly and insidiously, but to such an extent that the food, in place of acting as a natural restorative in a healthy condition of the digestive organs, was converted into and became an irritant poison. To what other cause, let me ask, can so many deaths, and such a similar train of violent symptoms, be ascribed? In a disordered state of the stomach and bowels, with systematic derangement, a very little food may prove equally detrimental as large quantities swallowed in a healthy and hungry state. The digestive process is greatly impaired when the animal's *vis vitæ* is exhausted by previous bodily fatigue, and is in addition oppressed with the more difficult assimilation of flesh, especially after many months of a previous dietary regimen, consisting entirely of milk and farinaceous and vegetable substances. The death of the bitch (which was not hunted) is a mere exceptional coincidence, and does not invalidate the opinion I have formed of the causes of the deadly outbreak, and may be regarded as a case of colic, terminating fatally at the season it prevails, the tone of her system being reduced by nursing, and thus predisposing her to such an attack. The conclusion to be drawn from these observations, if they are well-founded, consists in their practical application, viz., that the greatest care and attention is necessary in the feeding of hounds at the commencement of the hunting season, both with reference to the quantity and quality of the food allowed to them after a long-continued or severe day's hunting.—I am, Sir, &c.,

WILLIAM DICK.

### SMALL-POX IN SHEEP.

(From the *Scottish Farmer*, Dec. 10, 1862.)

THOUGH the sheep-pox may be considered at present a stale subject, it is one that calls for some remark; for we have information which proves that small-pox has visited the British Isles oftener than is generally supposed. Gentlemen extensively connected with the sheep trade in London assure us that their experience is annually to the effect that many of the animals imported from abroad prove diseased if kept over for a week or two. Though many people act with great caution in slaughtering animals that it may not get generally known they have the small-pox, attacks of this disease are none the less observed. How can



it be otherwise? Austria, Prussia, Mecklenburg, Hanover, Saxony, Holland, have been repeatedly, and Prussia is constantly, suffering from the sheep-pox. We import largely from these countries; and frequently the *apparently* sound sheep of a diseased flock are shipped for the London market. We are, therefore, not astonished to receive an assurance on the part of a gentleman of great experience, that the foreign sheep bought up by butchers and grazed in Middlesex, Surrey, Essex, Herefordshire, &c., have very often shown signs of the disease. One farmer had 100 ewes affected, and sold them off at a loss of £50. Were it not for the dangerous secrecy maintained on this subject, we might hear of it much more. As it is, we are privately informed that it is a great mistake to imagine that the outbreak in Wiltshire is the only one since 1850. This year, several outbreaks in flocks of dealers and butchers have been kept quiet. It is certain that the disease was in Kent, and also in Ireland, during the summer. Paragraphs appeared as to the disease committing ravages in Lincolnshire. A correspondent, who gives us information concerning the disease in Ireland, which we are not yet at liberty to publish, says:—"I must let you into the secret. The farmers in Ireland do all in their power to keep information from the public as to the presence of disease. Pleuro-pneumonia in cattle has raged to an alarming extent within a few miles of me, and I have not known it. The owners of stock in Ireland will have recourse to any scheme for the purpose of hiding or preventing a knowledge of the disease of stock spreading. You are aware that veterinary surgeons are not employed in cattle practice in this country; only in exceptional cases. They, therefore, have not the opportunities afforded them of gaining such information as would tend to benefit the profession at large."

Can we wonder that contagious diseases spread? How long shall we suffer such a state of ignorance, and worse?

The vaccinated sheep in Wiltshire have been inoculated for the small-pox, and some of them have actually died of the disease. This is in accordance with past experience, but the Wiltshire Downs afford good proof that vaccination is not needed to stop the disease. They also afford proof of the injury inflicted on flocks by inoculation, and we wish they could be visited by M. Reynal, who marvels at our ignorance for rejecting so valuable a means of prevention for the dreaded disease. This gentleman, a Professor at the Alfort College, writing in the *Recueil de Médecine Vétérinaire*, urges Professor Simonds not to relax in his efforts to demonstrate the value of inoculation, and adds that Russia, Austria, and Hungary have kept small-pox in check only by this means. We can inform both Professor Reynal and Professor Simonds that inoculation has perpetuated the sheep-pox in the countries where it is supposed to have been most useful. Its practice this year throughout Europe has been attended with most disastrous results.

## OVINA VARIOLA—SMALL-POX IN SHEEP.—SPECIAL REPORT.

(Continued from p. 755, Vol. iv.)

(From the *Field*, Dec. 6, 1862.)

ANY sudden outbreak of disease amongst cattle, and the consequent loss incurred by it, necessarily causes the proprietors of stock to consider what means can best be adopted to prevent disease or lessen its intensity. The remarks I have made have certainly been verified in the present year, during which period small-pox in sheep has raged in England, and the mortality caused by it has severely affected the agricultural interests of Wiltshire. But, as men directly protect themselves against corporal aggression, so do they indirectly against mercantile loss, and this same spirit leads them to act on the defensive and sometimes on the offensive, if circumstances demand it.

Now, in the case before the readers of the *Field*, viz., "ovina variola," it will be remembered that the malady was not diagnosed in Wiltshire until after Professor Simonds had inspected, pronounced judgment, and prescribed treatment.



Soon afterwards Professor Gamgee appeared amongst the diseased flocks; but while agreeing with Professor Simonds' opinion, that the extant disease was small-pox, he deprecated the system of inoculation, as calculated to extend rather than circumscribe the area in which the malady existed. Professor Gamgee advocated a system of separating the diseased from the healthy sheep, and destroying those in whom the hope of recovery was small; and this plan undoubtedly answered, for there were two farms, on each of which two variolous sheep in the early stage of the malady, were removed from their companions, and in neither of these flocks has any fresh case since broken out; whereas the inoculated flock at Langley was on the 3rd of November, in a very pitiable state.

The first idea which is naturally suggested to farmers and others when disease is devastating their herds, is, "What treatment shall I apply to eradicate disease? or, better still, what means can I adopt to prevent it?" The treatment has been alluded to above. When in Wiltshire, and bearing in mind that "prevention was better than cure," I suggested to Mr George Brown of Avebury, that, although Professor Simonds and Gamgee disbelieved in the utility of vaccination, it would be worth trying a few experiments. To this Mr Brown acquiesced; at the same time adding that several medical men had previously proposed vaccination as a preventative. Soon after this conversation a meeting was convened in Devizes by the Wiltshire Mutual Association for the Prevention of the Spread of Small-pox in Sheep, at which my presence was requested. At this gathering several matters were considered relative to the wording of certain rules to be printed for the guidance of the association, and afterwards the subjects of inoculation and vaccination were freely discussed. I there stated that it was our duty to obtain proof, and not to take statements for granted without investigating for ourselves. For this reason I advocated the propriety of testing the effect of vaccination as a preventive, on several sheep; and, in the event of the pock taking, to place such sheep in the midst of the previously diseased flocks. If the vaccinated sheep failed to contract the disease after a due time had been allowed for its production, then these sheep might be considered exempt from small-pox, and, consequently, vaccination might be looked upon as a preventive agent.

Lately, experiments on a somewhat extended scale have been carried on by the Royal Agricultural Society of England, under the supervision of Professor Simonds, and six ewes have also been vaccinated by Mr Parker, surgeon, Shri-venham. Four of these ewes, after the effects of vaccination had passed off, were allowed to remain eleven days with Mr Hulbert's flock; the other two were placed during twenty days in the midst of variolous sheep at Alburne, but were afterwards removed to Mr Hulbert's flock, where they stopped four days without manifesting the slightest signs whatever of small-pox, "although during the whole of that time small-pox was raging in both flocks to a fearful and virulent extent." On Monday, Nov. 3, the six ewes were inspected at Langley by Mr George Brown and Mr Parker; they were found to be perfectly healthy, and the only sheep amongst the flock free from small-pox: "the vaccinated ewes showed no symptoms of small-pox, and were, indeed, the only healthy ones in the flock."

Mr Hulbert's sheep were then examined, and one, considered to have passed through the various stages of small-pox and to have recovered, was caught, and inspection revealed the fact that the inside of its thighs were covered with pustules in a confluent form. From this sheep Mr Parker obtained lymph, and inoculated the six previously vaccinated ewes, and left them still with Mr Hulbert's flock. On the 13th of November Mr Parker wrote to Mr Brown informing him that he had inspected the ewes and found them affected by the inoculation, but not to the same extent as those which had not been vaccinated.

The question is often asked "What is the difference between inoculation and vaccination?" Inoculation is conveying a disease from one animal to another of the same species; whereas vaccination is taking a disease from one animal to another of a different species.

It seems that Mr Webb, of Wick, in Gloucestershire, was the first person who gave to the world the knowledge of the protective power possessed by cow-pox in preventing small-pox in the human subject; but be this as it may, it was left



to Dr Jenner to prove beyond doubt that lymph taken from the cow while labouring under variola, if injected into the human arm, would produce a mild form of disease and act as a preventive to small-pox—or at least would modify the eruption. It is proved that milkmaids and people engaged in dairies have the power of resisting variolous poison, and this must be attributed to their continued contact with the udder of the cow, where the pocks occasionally occur (oftener than is supposed) in a very mild form, and by this means with these people a continual antidote to small-pox is continually exerting its influence. We shall soon receive the reports of the experiments on vaccination, and I will then detail the results, as I am an advocate for vaccination, and like to see useful suggestions proved to be facts. As the subjoined points out clearly the manner in which the operation for vaccination is performed, it is reproduced.

It is most puzzling to know why inoculation has been preferred, when vaccien lymph is so readily come-at-able. Vaccinia, or cow-pow, is a most common disease, and enough matter can be obtained from one vesicle to vaccinate many scores of sheep. A hard colourless eminence is found upon a cow's teat, upon the centre of which, when about three days old, a concave vesicle appears, gradually increasing in size, when, on the sixth or seventh day, it presents a tense, prominent head—the surrounding surface of a deep red colour. Matter, taken from the eruption at this latter period of its growth, should alone be used for vaccination; and it is a spurious vesicle unless marked by the peculiarities above-named.

Vaccination, although a simple operation, requires some little caution in its performance. Make a perpendicular parting of the wool at the outside of the arm of the sheep; take hold of the limb, including the wool round the inner side, drawing the skin tightly; and, with the other hand, introduce the point of a lancet, charged with vaccine lymph, into the skin, in an oblique direction, and allow to remain in the same position for a moment or two, and then withdraw: the puncture should be compressed for a few seconds, in order to prevent it from bleeding, and the operation is finished.

The symptoms evinced by the subjects of small-pox in sheep has been previously dwelt upon, consequently they will not be detailed in the present article, but an endeavour will be made to describe the various treatments prescribed for the disease when manifest. The foremost, being that of Professor Simonds, viz., inoculation, and this, in order to produce by artificial means a "benign" form of the malady; and secondly, separation, and in many instances destruction. The treatment of inoculation has been previously condemned, as a system calculated to extend rather than circumscribe the disease known as "ovina variola," and reasons for this opinion have been fully made known in the columns of the *Field*.

But the system of separation, &c., as advised by Mr Hussey of Devizes, and afterwards backed by Professor Gamgee, deserves further consideration, for the simple reason that this treatment has answered, and the other (inoculation) failed, or more properly has aggravated rather than prevented the spread of variola. The last inoculated cases were, only lately, stated to be in a very pitiable state; whereas in the two flocks where separation was resorted to, two sheep only out of each flock showed symptoms of the malady, and no fresh cases have since occurred there—proving the utility of segregation.

The first course to be adopted in the treatment of small-pox in sheep is that of separation; the next to be described is the indication of the different medicinal agents prescribed—first by H. C. Miles, F.S.S., assistant-surgeon to the Royal Artillery, who in a paper on an Indian remedy for small-pox read before the Epidemiological Society of London, advised the use of the *Sarracenia purpurea*, vulgarly called Indian cup, or pitcher plant, as a medicine calculated to be of benefit in the cure of small-pox. Professor Cleveland, U.S., makes the following remarks on its effects produced:—

"My experiments are confirmatory of the utility of the plant in cases where there is a sluggish or torpid condition of stomach, intestine, liver, kidneys, uterus, or various functional derangements, and it must be evident that this



plant possesses valuable properties. It is even possible that a new salt, similar in importance to morphia and quinia, may be extracted from it, and thus a new and valuable remedy may be added to our *Materia Medica*."

This remedy seems first to have been discovered by the North American Indians, who, when small-pox broke out and devastated their tribes, used a decoction of the root of the *Sarracenia purpurea*, believing that it acted with prophylactic effect.

An Indian authority on this matter asserts that the root of this plant alone is beneficial in the treatment of small-pox, but that preparations made from the leaves are useless in that malady. The directions for the procurement and use of this decoction are as follows:—That the root when fresh gathered and divested of its thin fibres, should be slowly dried; that 2 oz. of the dried root should be cut into pieces and placed in an earthen pot, upon which a quart of cold water should be poured, and afterwards be permitted to simmer gently over a steady fire for two or three hours, "so as to lose one-fourth of its weight."

"*Observations*.—1. In the case of an individual suspected to be under the influence of small-pox, but with no distinct eruption upon him, a large wine-glass of an infusion of the root of the plant *Sarracenia purpurea*, or pitcher plant, is to be taken. The effect of this dose is to bring out the eruption. After a second or third dose, given at intervals of from four to six hours, the pustules subside, apparently losing their vitality. The patient feels better at the end of each dose, and in the graphic expression of the "Micmac," "knows there is a great change within him at once."

"2. In a subject already covered with the eruption of small-pox in the early stage, a dose or two will dissipate the pustules and subdue the febrile symptoms. The urine, from being scanty and high-coloured, becomes pale and abundant, whilst from the first dose the feelings of the patient assures him that "the medicine is killing the disease." Under the influence of the remedy, in three or four days the prominent symptoms of the constitutional disturbance subside, although, as a precautionary measure, the sick person is kept in camp until the ninth day. No marks of the eruption (as regards pitting, &c.) have been left in cases examined, if treated by the remedy.

"3. With regard to the medicine acting (as is believed by the Indians) in the way of a preventive, in those exposed to infection, it is curious to note that in the camps where the remedy has been used the people keep a weak infusion of the root prepared, and take a dose occasionally during the day, so as to "keep the antidote in the blood."

These observations by the Indian have been fully corroborated by Europeans who have noticed that consequent upon the administration of the root *Sarracenia purpurea* to persons covered with variolous eruptions, the following results have manifested themselves:—

"1. Rapid diuretic action with immediate lessening of the febrile symptoms; and, more tardily, it acts as an evacuant on the large intestines.

"2. On a repetition of a dose of the decoction (which perhaps should be given after three or four hours, instead of at longer intervals), the mitigation and obvious improvement, should any symptoms of cerebral disturbance be present.

"3. Its extraordinary effect (within a brief period) in altering the *character* of the cutaneous eruption. It seems to arrest the morbid process, and induce a healthy instead of diseased action. The pustules appear simply to be deprived of their vitality; they desiccate and fall away.

"4. The prevention of *pitting*, consequent, it may be supposed, on the whole nature of the pustule being changed in the manner just noted."

Dr Marson of the Small-pox Hospital, has promised Mr Miles to afford a thorough and satisfactory trial of the decoction of this root as a cure for small-pox; and I trust that others will endeavour to throw additional light upon the matter. The dried root of the *Sarracenia purpurea* can be obtained of Messrs Savory and Moore, London.

The fact of the prevalence of ovina variola in England elicited a letter from Dr Rennie of the 31st Regiment, serving in China. Dr Rennie's theory is, that



small-pox is generated, like typhus fever, owing to the neglect of sanitary and hygienic measures, which neglect permits the generation and elimination of fetid compounds, and they entering the animal economy, deleteriously affect it by contaminating the blood with this supposed malarious poison. This foreign and injurious substance, when pervading the system, devitalises it, and consequently an effort on the part of nature is called into operation, which attempts, by throwing out a pustular eruption, to eradicate the virus from the system.

This eruption, according to Dr Rennie, "when it falls upon the lungs, receives the name of pneumonia or consumption; if on the intestines, it is known as dysentery; if on the liver, as abscess."

The treatment prescribed in cases of cutaneous eruptions is the external application of a liniment consisting of a tartar emetic and croton oil, the effect of which, the doctor states, is the production of a strong "galvanic or electric" action, which causes the eruption to assume a "healthy and mild form." The doctor considers that a further investigation of small-pox will lead us to the direct use of electricity. The report forwarded contains several cases successfully treated in the human subject by the above means.

The sudden outbreak of small-pox amongst sheep during the present year is totally inexplicable, as in Mr Parry's sheep, which were the first to take the malady, there had not been fresh importations to the flock on the female side for at least half a century, new male stock having only been introduced every other year, and it was at the time of the outbreak two years since Mr Parry had purchased male animals. Neither could it have originated as the result of infection from the shearers of Mr Parry's sheep, all the flocks previously sheared, and by the same persons, being known to have been in a perfect state of health.

The first appearance of ovina variola in England took place in 1847, by the introduction of some Spanish sheep into Smithfield Market, which communicated the disease to two flocks belonging to Mr Statham of Datchet, near Windsor, and Mr Weale of Pinner, and afterwards found its way into Norfolk and Hampshire; but was previously to 1849, eradicated. It again unfortunately broke out in 1853 in Essex, Suffolk, and Norfolk, when its propagation was traced to foreign sources, and its progress ultimately frustrated. From this period until the present year no instance of small-pox (as far as public knowledge of the matter goes) has been heard of amongst sheep. The spontaneous origin, therefore, of ovina variola was put down this year as an unheard-of idea both by Professors Simonds and Gamgee: it was argued that small-pox was unknown amongst sheep previous to the repeal of the law prohibiting the introduction of foreign stock to Great Britain, and that its production in 1847 and 1853 was satisfactorily traced to the Continent; and that therefore its origin during the present year must have been caused as the result of infection by the importation of foreign stock. But all the questions suggested by Professor Simonds to Mr Parry, as to the possibility of its introduction from without, were negatived by most satisfactory reasons and answers by the latter. There seemed, therefore, no solution for this problem (the origin of ovina variola.) Professor Simonds never attempted it. Professor Gamgee, after his investigation, made a statement to the effect, that diseased flocks imported from the Continent might (and he considered had), during the night, traversed the very downs over which Mr Parry's flock browsed during the day, and that by this means, by contagion or infection, the flocks were contaminated and afterwards became diseased.

If Professor Gamgee's position is correct, viz., that foreign variolous sheep fed on the downs in question, what then became of those animals that are supposed to have left the infection behind them? Why, they must have gone to other downs and similarly affected other flocks; but such has not been the case, at least we have not heard of it, and Professor Simonds, who has most carefully examined the locality, states that "there is no ground for the opinion that Mr Parry's flock took the disease from any animals passing along the so-called drifts. The fact being fully established, that the sheep were on the most distant part of this farm, something like two miles from the by-paths, at the time they were first exposed to the infection, nor can it in any way be proved that 'inoculated flocks, through



carelessness or inadvertency of the shepherds, communicated the disease to other flocks.' ”

In a conversation with Mr Parry, when at Allington, he informed me that it was impossible for his flock to have contracted small-pox on the downs, as they had not fed off them for months, but had been in the valley, there placed in a field bordering the banks of a canal; and he further added, that this canal led to a super-phosphate of lime manufactory, to which, by means of barges, bones and skins found their way to the above establishment. It therefore occurred to me that it might be within the range of possibility for the bones or skins (having previously belonged to variolous subjects) to have carried the infection of small-pox to the flock at Allington. A strict investigation of this matter might tend in some way to elucidate this vexed question.

J. I. LUPTON, M.R.C.V.S.

### NOTE ON THE CUMULATIVE ACTION OF MEDICINES.

By ALEXANDER FLEMING, M.D., Fellow of the Royal College of Physicians, London, and Physician to the Queen's Hospital, Birmingham.

(From the *Edinburgh Medical Journal*.)

IN my lectures on therapeutics, I have found it useful to the student to describe three modes of exhibiting medicines, in relation to the interval between the doses; the *simple*, where the second dose is not given until the action of the first has completely subsided; the *sustained*, where the doses are repeated at such intervals as to keep up without increase or diminution the required degree of physiological action, as in the use of wine; and, thirdly, the *cumulative*.

Although the term cumulative action is much used, it is often wrongly applied, and its meaning is, at all times, vague and uncertain. It is commonly employed to denote the exhibition of a medicine for some days, in small and repeated doses, without marked effect, when suddenly and unexpectedly violent and, it may be, dangerous symptoms of its action are developed. The successive doses are supposed to remain in some obscure and unexplained way quiescent in the blood, until the so-called cumulative action is manifested. The administration of digitalis and strychnia are cited as affording examples. It is said that digitalis may be given continuously for several days, and apparently without effect, when suddenly a feeble irregular pulse, fainting and cold sweats, usher in the poisonous action of the drug. In like manner, successive pills of strychnia may be taken and remain inert, when unexpectedly and suddenly severe tetanic symptoms supervene.

Now the sudden eruption of alarming symptoms during the continuous use of these medicines can be satisfactorily explained without reference to any mysterious agency. In the case of strychnia there is no cumulative action, but simply an example of the non-solution and retention of the medicine in the stomach and bowels. It is observed only when the medicine is given in pill. This alkaloid is hard of solution in the gastric fluid, and one, two, three, or more pills are apt to remain undissolved and accumulate in the stomach or bowels. Suddenly, from some change in the patient, there is an abundant flow of gastric juice, and all the pills are simultaneously rendered soluble and active. This apparent cumulation of strychnia is never observed when it is given in solution. In the exhibition of digitalis, on the contrary, as I shall presently explain, we have an example of true cumulative action but imperfectly observed and understood.

I think it would be more correct to restrict the term *cumulation*, or *cumulative action*, to denote exclusively the gradual increase of physiological action from the successive exhibition of equal doses. When a second dose is given before the effects of the first have passed away, we add to what remains of the action of the first the full operation of the second, and so on with the third and subsequent doses until, finally, the sum of effects exceeds the limits of medicinal, and passes into those of poisonous action.



In the exhibition of mercury, arsenic, aconite, digitalis, and other medicines, we adopt the cumulative mode, because it is safer and more efficient. The tolerance of these medicines varies so much that no physician can say what amount of any one of them is required to produce a given degree of physiological action. He might exceed the proper dose and cause danger. But by the cumulative addition of the effects of successive doses in the manner described we advance cautiously and safely to the required degree of action, and the symptoms are more under control. The interval between the doses is determined in each medicine by the duration of its action. Between successive doses of mercury it may be twelve or even twenty-four hours, while to secure the cumulative action of digitalis, it should not exceed four to eight hours. Our knowledge here is imperfect in respect to many drugs, and cannot be reduced to rules.

The cumulative mode of exhibition is most necessary with sedatives, as aconite and digitalis; and in using them the pulse must be carefully observed, for it is an important fact, in connection with sedation, that the circulation may be lowered to a remarkable degree without the patient being conscious of, or showing any material change in his other functions. But carry the depression just a little further, and the heart's action is suddenly and seriously embarrassed, and the patient has fainting, cold sweats, and a sense of impending dissolution. Now, the early effects on the pulse of the cumulative depression of digitalis are apt to be overlooked, and the belief obtains, as already stated, that the first doses produce no effect whatever; but this is an error. I have often watched the cumulative use both of digitalis and of aconite, and have never failed to detect depression of the circulation from the early doses, and its subsequent gradual increase. I should add that, as a sedative, I am careful to give digitalis; so as to secure its prompt and easy absorption, and to avoid its local irritant effect on the stomach, which complicates the general symptoms of the medicine.

On the other hand, in the administration of atropia and strychnia it is no less important to avoid cumulation. Their use often extends over a considerable time, and it is safer to use the *simple* mode of exhibition, and to give the doses at such intervals that the action of the first has entirely subsided before the second is taken. Nor is there any danger with these drugs in inducing the required degree of medicinal action with one dose, provided its amount be determined by careful trials, commencing with small and advancing gradually to larger doses. For example, I gave atropia thus,—10 minims (containing  $\frac{1}{10}$  of a grain) of a solution are exhibited once daily, and the dose is increased daily by 2 or 4 minims until I obtain the required degree of atropism. The action of one dose endures sixteen or eighteen hours, but ceases before the next is given, and there is no cumulation, which it is safer to avoid, especially as the use of atropia is often continued for several weeks.

There is another order of physiological effects, sometimes named cumulative, which require notice here. They have been observed to follow the use of alcohol and aconite. I refer to the wakefulness, tremor, and exhaustion (delirium tremens), from prolonged excess, symptoms quite different from the ordinary stimulant and narcotic action of spirit, but distinctly traceable to its *continued use*. In the same manner I have observed in patients who have been taking aconite in full doses for a lengthened period, that ultimately they have become affected with general tremors, severe pain in the head and eyeballs, constant lachrymation, intense photophobia, heat of skin, quick pulse, and great restlessness, symptoms, which, while very different from the ordinary sedative action of aconite, were clearly attributable to its long-continued employment. In the cases where I noticed these results, the aconite being discontinued, the symptoms, which were by no means alarming, subsided in a day or two. Effects allied in nature to this action have also been traced to tobacco and to mercury.

In my lectures, to prevent the student confounding these effects with cumulation, I found it needful to distinguish them by the name of *sequel* action. At present the study of the sequel action of medicines does not offer much interest in the way of practical application; but it might at a future time acquire more



importance. For example, one of the patients who exhibited the sequel action of aconite, had been long a confirmed intermittent drunkard. From the time that he presented these symptoms, the craving for spirit, previously so irresistible, never returned, and he continued to lead a sober life for at least four years while I knew him. Meantime, it is well not to confound together things essentially distinct. The sequel action is due to the continued exhibition, and is a direct operation of the medicine, and must not itself be confounded with the symptoms which arise from the sudden suspension of a drug, such, for example, as opium, to which the body has become habituated. The extreme nervous prostration and excessive perspiration, urination and diarrhoea, which supervene on the sudden withdrawal of the habitual supply of this narcotic, are a good example of one of the forms of medicinal *reaction*. The cumulative and sequel actions are both phenomena of the forward, the reaction of the backward, swing of the physiological pendulum.

In relation to strychnia, I have already referred to the error of confounding true cumulative action with the accumulation of medicine in the bowels. This evil happens with solid medicines as caustic magnesia, strychnia, and calomel, which require the intervention of the gastro-intestinal secretions for their solution and absorption. If the dose exceed the solvent power of the fluids, or these are deficient in quantity, then a portion or all of the medicine remains undissolved, and is either expelled quickly by stool or lodges for a time in the bowels. If while there the visceral fluids become more abundant, it may be suddenly dissolved and by its absorption give rise to severe effects. I could cite many examples of this, but I have said enough to make evident the distinction between cumulation and the effects produced by the sudden solution and activity of a solid drug which has accumulated in the bowels.

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## ORGANIZATION AND LIFE.<sup>1</sup>

(*From the Intellectual Observer.*)

FROM the earliest ages of speculative thought, the human mind has occupied itself with the vast and perplexing questions of organization and life; but notwithstanding centuries of experience to show the proper limitations of such an inquiry, it is still rare to find a writer or an investigator who will adhere to an inductive method, and abstain from mingling the guess-work of mere hypothesis with the pursuit of experiment, or the elucidation of fact. An inquiry into organization necessarily belongs to the domain of physical science, and demands physical methods of procedure, which are incapable of dealing with elements of a purely metaphysical kind. Physical science reveals a wondrous order and harmony of forces and arrangements, extending through all the time and all the space with which we are acquainted; and as our minds take cognizance of such facts, we are irresistibly led to the contemplation of an Intelligent First Cause. Let us, however, distinctly understand that it is not a mechanical process, a chemical process, or a physiological process that conducts us to this result; all that the physical sciences do is to give us information, about which we cogitate according to the laws of thought, and thus arrive at a perception of their connection with a class of powers that no physical methods can reach. The apparatus of the chemist, the scalpel of the anatomist, the microscope of the minute inquirer, or the telescope of the astronomer, cannot be employed without displaying to us the results of Will, Intelligence, and Design; and yet it cannot be said that it is through them that we learn the primary truth concerning the Source and Origin of all the phenomena which Nature presents. An inquiry into life requires the combinations of physical and metaphysical methods, because under the term life we include things which differ as widely as human emotion and the develop-

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<sup>1</sup> *La Vie et ses Attributs dans leurs rapports avec la Philosophie, l'Histoire Naturelle et la Médecine*, by L. Bouchut, Médecin de l'Hôpital Sainte Eugénie. Professeur agrégé de la Faculté de Médecine, Chevalier de la Légion d'Honneur, Bailière.



ment of an egg. We say life is one, and we say nature is one, but we do not mean to assert that there is no difference between a granitic mountain and a shooting star, nor ought we to forget the distinction that separates the function of digestion from an impulse of the mind. To call life a *principle* is to place ourselves on the highroad to confusion, because we start with a definition which assumes a knowledge that we do not possess ; and we moreover jumble together a variety of causes and effects.

A principle means a *beginning* of some kind. The principles of a science are those elementary facts and conceptions which form its foundation. In another sense, a principle is a first cause. We likewise find that principle is often used to signify not a sense, but a nonsense, and thus we hear of the "electrical principle," the "caloric principle," the "vital principle," or any similar phrase intended to give ignorance a learned look. If we take life to mean all the acts and properties exhibited by living beings, our first business is to separate them, and study each class in an appropriate way. The phenomena that belong to physical science will have a physical cause for their appearance ; and a physical cause is not a volition, or an intelligent power, but simply a condition, or assemblage of conditions, that are invariably followed by another state of things that we call an effect. If we ask *why* there is this invariable link between certain antecedents and certain consequents, physical science cannot tell ; and it is a metaphysical science that resolves the difficulty by pointing to that Intelligence which is the Great Cause of all.

Those who are curious to study the history of opinion on the question of vital manifestations will find it ably traced in Barclay's *Life and Organization*, and it is interesting to note that, so early as Empedocles, a bold effort was made to avoid the confusion into which investigators are still apt to fall. According to that philosopher every animal possessed a rational and a sentient soul, the former derived from the gods, the latter from the four elements of which it was imagined that the universe was composed. In this rude hypothesis there is an attempt to separate the phenomena of organic life from those of consciousness, which we do not find in M. Bouchut, the latest writer on the same subject, who tells us that "by *vital force* matter *feels, moves*, and assumes *forms* more and more complicated, from the creation of vivifiable organic matter to the most completely organized being." This same "vital force" which has bewildered so many subtle heads, M. Bouchut considers he has "demonstrated" to be "extra-organic," and he calls it "an *intermediary of the soul*,"<sup>1</sup> whose mysterious union with the body represents the entire being. Plunging thus headlong into conjectural metaphysics, we are not surprised to be told that "life creates in each species of creatures the special organs that are to serve as the instruments of its activity. The functions create the organs, and after that all goes on by the mediation of physical laws." We hope this learned Professor does not represent the condition of French intellect dwarfed by Napoleonic despotism ; but we read with astonishment his arguments to prove the strange theory we have announced : "All vegetables and animals *feel*," so runs the book, and they do this "with or without organs of sensibility ; they all *breathe*, but with different organs of respiration, from the plants which have no respiratory apparatus, and certain animals that breathe through all their tissues, up to insects which respire through trachæal tubes, fish that have gills, and birds and mammals that possess lungs." "Here is a fact," exclaims our author, "which proves against those who contend that the organ creates the function ; and it is infinitely more true to say that the function creates the organ." Whether the animal be a simple polyp or a complicated man, the function is not performed until there is an organ to perform it ; the difference is, that in the higher creature an immense advance has been made in the adaptation of a special structure to a special use.

Even apart from intellectual manifestations, it is clear that living beings do things that are not done by inorganic matter ; but we are not entitled to ascribe the whole assemblage of such acts to a "vital force," or some entity totally

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<sup>1</sup> *Intermédiaire de l'âme.*



distinct from any physical force; nor should we say that "when once *life is incarnated in matter*, it produces effects which in their turn act as causes," and so forth. We can trace the circumstances under which an animal lives, but, apart from religious ideas, we have not the faintest conception of *why* it lives, nor will physical science help us in the research. In his great work on *Logic*, John Stuart Mill remarks, that although it would be an important addition to our knowledge, "if proved, that certain motions in the particles of bodies are among the *conditions* of the production of heat or light; that certain assignable physical modifications of the nerves may be the *conditions* not only of our sensations and emotions, but even of our thoughts; that certain mechanical and chemical *conditions* may, in the order of Nature, be sufficient to determine to action the physiological laws of life;" still, "it must not be supposed that by proving these things, one step would be made towards a real explanation of heat, light, or sensation." In the same spirit, Bacon warns us "not to suffer the understanding to jump and fly from particulars to remote and most general axioms (such as are termed the principles of arts or things)," and he adds, "we must not even add wings, but rather lead and ballast to the understanding, to prevent its jumping or flying, which has not yet been done; but whenever this takes place we may entertain greater hopes of the sciences." Had M. Bouchut followed the Baconian advice he would not have told us that the "three attributes common to everything endowed with life are, (1.) *impressibility*, or the unconscious faculty of feeling external impressions without any participation of the nervous system; (2.) *corpuscular movement*, automatic movement, or *autocynesy*, that is to say, the faculty possessed by the elements of living matter to move themselves in order to form species, and to do this without dependence on the properties of any structure;<sup>1</sup> (3.) *promorphosis*, or faculty of giving to amorphous elements a form determined beforehand, and conformable with the type of the species." An "unconscious faculty of feeling" is not intelligible: a faculty or facility, for the words are the same in origin and meaning, can be neither conscious nor unconscious, and an unconscious feeling is no feeling at all. In describing the second alleged property of every living thing there is equal confusion. What is meant by the "elements of living matter?" Are the atoms of oxygen, carbon, and so forth, declared to possess an automatic power, independent of the structure to which they belong, "to move themselves in order to form species?" "Impressibility" is affirmed to be "an attribute of life which exists in all tissues, which it animates independently of their textures." The physiologist does not know life apart from some living thing, and when a writer addresses us like M. Bouchut, he is substituting metaphysical guess-work for scientific fact.

Life, as we know it, consists in actions that are obviously physical, and in operations that bear no analogy to any physical process. It is probably a complete mistake to represent life as controlling or resisting mechanical, chemical, or electrical forces. While an animal lives, its tissues are built up and taken to pieces according to a regulated method which is compatible with its continued existence, but all the physical operations of its life proceed in strict accordance with physical laws. If its albumen does not coagulate at a temperature that causes other albumen to undergo that change, it is not because a mysterious "principle" determines otherwise, but because the chemical conditions of coagulation exist in one case and not in the other. The power of maintaining heat is purely physical, and combustion follows the same laws in the body of the man as in the furnace of the locomotive. The power of resisting heat is equally physical, resulting from evaporation and other processes which experimental science can trace. When the body is dead, the amount and direction of the forces is altered, and then, of course, the changes that ensue are of a different kind. It is incorrect to say that no change has taken place except the escape or departure of an immaterial principle. The nerves no longer transmit, nor do the nerve centres generate, those physical forces that determine the actions of structure that is alive. Mr Lionel Beale discovers a complete circuit in the nervous

<sup>1</sup> "En dehors de toute propriété de structure."



system, strengthening the analogy with phenomena of an electrical kind. Other physiologists trace a connection between the consumption of phosphorus and the amount of thought performed by the brain. Here we have two sorts of incidents, the connection of which no physical investigation can elucidate. The changes in the brain, and in the secretions, no doubt, follow chemical and other physical laws, and are simply the results of the direction and intensity of forces of the same character as those which preside over the material world. They thus form fitting subjects for the research of the physiologist. But when we arrive at the question of why thought is connected with a brain, and why changes in the condition of that brain precede or accompany mental manifestations, our inquiry belongs to a totally different sphere. No polarization of particles, or oxidation of phosphorus can help us here. The ultimate cause is the will of Deity; and if we seek for more we must do so in the direction of utility, and correspondence with that great scheme of creation, of which so small a part is unfolded to our gaze.

Let physical science give up the search for the *why*, and tell us *how* the universe proceeds. We start, and we conclude, with the conviction that an Intelligent and Benevolent Will is in all and over all, and in tracing the wonderful operation of what we call secondary causes, we exalt our conceptions of the only real Cause that animates and guides the mighty whole.

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I.—ON TYPHUS IN THE PIG. By C. SCHMIDT, Veterinary Surgeon at Jesberg, in Kurhessen.

FOR years a disease has prevailed in a plague form amongst pigs, which appears to be common to every part of Germany. It is much like a form of anthrax, and perhaps holds a middle position between this and other blood diseases. Schmidt does not regard it as anthrax, but rather to possess the character of typhus.

The symptoms of this disorder are as follows:—The animals are seized rather suddenly, the owner of the herd not having, as a rule, observed any premonitory signs which usually exist, and are—general dulness, hanging of the ears, a desire on the part of the animal to hide itself or get into shady places, or creep beneath straw. There is a total loss of appetite, and no desire to drink; the animals lie constantly, and prefer lying on their belly; continue to bury themselves in straw, and will take no food or drink with the exception of a little milk. As a rule, the animals are very quiet, but only in exceptional cases, are very wild in consequence of cerebral irritation. Not unfrequently there are attempts to vomit, and mucus, mixed with bile, is thrown up, or, in some cases, food. The vomited material has usually a very sour odour. The excrements are at times of a normal character, but at others dry, covered with mucus, or there may be a slight diarrhoea, and the faeces of a dark colour. The urine is pale. The animal has a staring look, indicative of pain. The tail, which is usually curled, drops. The pulse is very frequent, and the heart beats are barely perceptible. Great pain is indicated by pressing on the abdominal organs. One of the leading symptoms consists in weakness in the hind extremities, which occur in all patients from the beginning of the disease. Another characteristic sign, is a peculiar jerking, or spasmodic breathing, which occurs, however, only in those animals which after death indicate venous congestion of the lungs. The staggering gait, in which the animal's limbs are seen to cover each other, and the subsequent paralysis of the hind extremities, are very constant phenomena in the course of the disease. One veterinary surgeon reports having seen paralysis of both fore extremities, but M. Schmidt had never witnessed this. The breathing, which, as stated above, is sometimes jerking, is audible and associated with a gasping, broken and painful cough. The voice is at first loud: the animal can



scream out, but afterwards becomes hoarse. On opening a blood-vessel by cutting the ear or tail, a fair amount of apparently normal blood is obtained in the first stage, but afterwards it flows like treacle. In the larger number of patients, a few hours before death there are ecchymoses of the skin and especially under the belly, on the inner surface of the hind extremities, on the back, beneath and over the ears, &c., indeed over the whole body, along the back to the tail, and all this without any appearance of erysipelas. The red colour disappears on pressing with the finger, and the animal experiences pain under such pressure. The skin becomes swollen, or vesicles form on its surface. The colour varies from a light red to blueish black. On many animals this red colour is wanting, and does not occur even after death, whether the pigs be well or ill nourished, young or old. In the rapid cases the mucous membranes are of a blueish red colour, and in the chronic cases of a dirty yellow colour. The temperature of the body is at first increased, but afterwards lowered. Schmidt has seen blood oozing through the skin in two cases. The blood appeared through the cutis, accumulated in small drops about the hairs. In both the cases Schmidt saw the transudation of blood through the skin appeared a critical sign, as both animals recovered after it.

The disease usually terminates in death, or in partial convalescence. A fatal termination often occurs from the third to the sixth hour from the commencement of the disease, or death may occur at a later period, but always without convulsions. The convalescent stage is long, and health is imperfectly restored after it. Although animals may regain their appetite, they are apt to fall backward, suffer from cachectic disorders. They suffer from more or less complete paralysis of the hind extremities, or of rheumatic joint disease, which is attended with much pain.

The prognosis is unfavourable, though M. Schmidt has been unsuccessful of late with a new plan of treatment he has adopted.

*Post-mortem appearances.*—The animals dying of this disease are of a brown, violet, or bluish-red colour over their whole bodies, or more particularly in the parts specially mentioned as discoloured during life. The capillaries of the skin are filled with blood wherever there is a change of colour of the skin. The cutis is swollen, and an exudative or yellowish serosity is thrown out in the vicinity of the blood-vessels. The peritoneum and intestines are normal, though there may be streak-like spots of blood, imbibition, or venous congestion. The liver and spleen are congested, of a dark colour, and the parenchyma of the liver, more particularly, is soft, but still healthy. The vena porta is always full of dark semi-fluid blood. In the abdomen and thorax the amount of fluid is increased, and is of a reddish colour; a similar red fluid is seen in the pericardium. The kidneys and other abdominal organs are sound. The lungs are either quite normal or much congested. In the latter case, they are of a dark red colour, and more firm or compact than usual. In many cases there are ecchymosis on the pleura. The heart is flabby, the auricles of the ventricles filled sometimes with fluid, and at others with coagulated blood, and the ventricles the same. The inner lining membrane of the large blood vessels, the brain, and spinal cord, often show signs of ecchymosis. The blood is constantly of a darker colour than normal, and it is usually semifluid, and not coagulable to any extent. It coagulates slowly, and does not form a firm clot.

Schmidt says that the above post-mortem appearances are not those of anthrax, but they are very similar to those of a disease which Dr Spinola describes in his work as Erysepeletous Anthrax. There are other reasons, however, to adduce in proof of the disease not being anthrax.

*Firstly*, The disease occurs in districts where it is notorious that anthrax never appears in other animals. If it were anthrax, why should it attack the pig in preference to other animals more predisposed to the disease?

*Secondly*, There is not a case known of the communication of this disease from sick pigs to other animals, or to human beings, and surely the opportunities have not failed. Schmidt has inoculated dogs, cats, poultry, and a horse without any result. Men have eaten the flesh prepared in all ways, and have never suffered



*Thirdly,* The specific lesions of anthrax are absent in this disease.

*Fourthly.* The disease has a constant typical form, whereas anthrax varies greatly in different cases.

*Fifthly.* No evidence has been adduced to show that a contagium occurs in this disease, but rather that it does not.

The causes of this disease, like those of many similar affections, are involved in mystery; the disease, however, occurs as an enzootic during hot seasons. Sporadic cases occur in winter, when Reaumur's thermometer stands at 20°. Small lean pigs are as readily attacked as older and fat ones. All breeds are affected alike. The nature of the locality has little influence, as outbreaks occur on highlands as on lowlands, on wet or dry soils. It occurs suddenly, carries off many animals, and again suddenly ceases. Schmidt's observations would lead to regard the disease as due to peculiarities of food and water, to sudden sinking of the temperature, and it occurs more frequently in animals in the open fields than in those inclosed in styes. The disease does not spread by contagion.

In the treatment of this disease it is essential to counteract the morbid changes of the blood, and to place animals beyond the influences operating in the production of the disease. These are not points easily attained. Schmidt condemns the common practice in Germany of giving these animals emetic doses of vetratrum albrum, or the potassio tartrate of antimony; he also condemns the frequently-resorted-to blood-lettings and cold ablutions. Animals treated thus, especially if they have previously vomited, seldom recover. Schmidt condemns Spinola's method of treatment, he condemns the universal acids, tannin, salts of iron, of copper, &c. Death always resulted when M. Schmidt treated these animals after this system, and in rare instances only did the pigs live, but then partially paralysed in the hind extremities.

Schmidt adopted the system of administering an active purgative, as follows:—

R Calomel	.	.	.	.	.	.	℥j to ℥ij.
Croton oil	.	.	.	.	.	gtt. iiij. to ℥vi.	
Castor oil	.	.	.	.	.	.	} āā ℥j.
Mucilage	.	.	.	.	.	.	
Water	.	.	.	.	.	.	℥iv.

M. A table-spoonful to be given every two hours.

The result was most satisfactory. Of twenty treated thus in one day only one died. All the rest recovered completely. Bleeding, cold ablutions, and emetics had been, however, given to these pigs, with the exception of the one that died. Since his first experiment Schmidt has been successful in all cases, except those where there was already considerable paralysis of hind quarters, or where the cases were of old standing, and lastly, when the red discoloration was very extensive; in such cases radical cures were rarely obtained. The dose of the medicine depended of course on the size of the pig, and also according to the condition of the alimentary canal. When diarrhoea had existed prior to the application of remedies, croton oil was not given; small doses of calomel were administered in mucilage, with a preparation of nux vomica. This lead to a mild action of the bowels without inducing absolute purgation. When, however, purgation is obtained, the medicine is stopped. The animals must be kept in a cool and healthy stable, with dry straw. So soon as any thirst is experienced, sour milk, bran and water, may be given, and later, as the appetite is regained, lettuce, green fruits, &c., should be allowed.

Preventive measures consist in change of diet, cleaning the styes, and if the disease is prevailing to a great extent, sulphuric acid or muriatic acid must be given in small doses in water thrice daily.

The sale of the flesh of these animals has not been attended with bad results to the health of those who have eaten it, but Schmidt condemns such sale, especially where there is reason to suspect a prevalence of anthrax.



II.—ON PENTASTOMA TÆNIOIDES OF THE SHEEP. By Dr FÜRSTENBERG,  
Veterinary Surgeon, Eldena.

It is well known that Leuchart<sup>1</sup> has recently shown by experiment that *Pentastomum denticulatum*, which is found not unfrequently in bodies of rabbits, is the partially developed *Pentastoma tænioides* which occurs frequently in the nasal sinuses of the dog. Moreover, Leuchart has shown that when this parasite has attained maturity in the dog's head, ripe eggs are thrown off to ensure the multiplication of the species. These eggs are given off and discharged with the mucus in the act of sneezing, &c., and they are then taken up by animals, on whose bodies the embryos undergo a certain stage of development.

The pentastomum had not been seen in its undeveloped state as scolex in all our domestic animals. It had been found in the abdominal cavity of goats and cats. In the first, the parasite was the *pentastomum denticulatum*, and in the second, *pentastomum fera*. Colin, however, has recently found it in the sheep and dromedary.<sup>2</sup>

In the mesenteric glands of the last-named animals, there exists an asexual *linguatula*, which acquires a generative apparatus on changing its habitation. These parasites penetrate the gland, are lodged in a capsule which contains several individuals. As the containing capsule enlarges, disease of the gland tissue occurs, and changes into a mass of cells not unlike ordinary lymph corpuscles.

The parasite of the mesenteric glands is developed from the eggs of the parasite of the nasal sinuses of the dog, which are gathered up by the sheep with their food. The worm only remains a definite time in its first abode, as it pierces the glands and leaves a cavity which soon gets filled up by plastic tubercular material.

When a dog or wolf eats the entrails of animals in whose glands the parasites exist, the embryo may adhere to the lips and nose, and then pass into the nasal cavities. Fürstenberg says that the *linguatulæ* pass up the nose rapidly, and fix themselves by these hooks to prevent being expelled in the act of sneezing.

These worms which so suddenly change their habitat, increase in size, and their generative organs are developed in less than two months. They must remain a year in the nose of the dog, in order to attain complete development.

There can scarcely be a doubt, says Fürstenberg, that the *linguatulæ* found in mesenteric glands of sheep, belong to the same species as those discovered in cysts in the lungs of rabbits, and whose complete development in the dog Leuckart has witnessed.

Fürstenberg has therefore confirmed Colin's observations, and added some new facts as to the escape of the *linguatulæ* from the mesenteric glands.

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## MISCELLANEA.

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DISEASE AMONG CATTLE AT VIENNA.—An epidemic disease, which for the last six months had been raging among the cattle in the different provinces of the Austrian empire, has now shown itself at Vienna. In two of the large dairies of the faubourgs, by which the city is principally supplied with milk, sixteen cows which had been seized with the malady have been destroyed by the authorities. The effect of the disease is felt even in the skin trade. The breeders, fearing to lose their cattle, slaughter them in large numbers, thus causing a glut of skins in the market.

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<sup>1</sup> *Bau und Entwicklung der Pentastomen.* Von R. LEUCHART. Leipzig and Heidelberg. 1860.

<sup>2</sup> See *Edinburgh Veterinary Review*, vol. iii. p. 682.



SILVER DEPOSITED WHERE LEAST EXPECTED.—In the Geological Museum in London there is a lump of silver—about as much as would make forty shillings—which is stated to have been taken from the stomach of a mule in Mexico. It appears to be a common occurrence to find quantities of silver in the stomach and intestines of the mules working in the Mexican silver mines, and its presence is accounted for by the mules eating mud, which contains much silver, for the purpose of obtaining the salt which is mixed up with it also. The silver is said to accumulate to a considerable extent without proving injurious, and this furnishes us with another fact to indicate how living tissues tolerate the presence of metallic substances. A correspondent facetiously suggests that the Mexican veterinary surgeon will find their fees for post-mortem examinations in the stomachs of their patients.

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## ROYAL COLLEGE OF VETERINARY SURGEONS.

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At a meeting of the Court of Examiners on the 18th December, the following gentlemen, late students at the Royal Veterinary College, London, having undergone the necessary examinations, were admitted Members of the Royal College of Veterinary Surgeons:—

RUPERT MOSLEY, London.

JOSEPH THOMAS BUSHMAN, Curragh Camp, Ireland.

JAMES WORSLEY, Worsley, Lancashire.

JOHN JOSEPH SPERRING, Barnet, Herts.

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### Obituary.

MR GEORGE COOKE, M.R.C.V.S., Newcastle-on-Tyne.

MR BERNARD REYNOLDS, M.R.C.V.S., Newbridge, Ireland.

MR DANIEL BOVETT, M.R.C.V.S., Bridgewater, Somerset.

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WE are informed that Mr J. H. B. HALLEN, late Veterinary Surgeon in the Bombay Artillery, has been appointed Principal Veterinary Surgeon in the Indian Army. This appointment has arisen from an attempt to copy the warrant recently granted to Veterinary Surgeons in Her Majesty's Service, but it is not unlikely that there will be shortly an amalgamation of the British and Indian Veterinary Departments.



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### ORIGINAL COMMUNICATIONS AND CASES.

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*Soundness in Horses.* By JOHN GAMGEE, Principal of the New Veterinary College, Edinburgh.

#### ARTICLE V.

Disorders of the digestive organs continued.—Parrot-mouth.—Irregularities of teeth. Crib-biting, a habit engendering disease.—Nature of crib-biting.—Wind-sucking. Is the act one of eructation or swallowing air?—A voluntary act.—Occurrence of tympanitis.—Bracy Clark's views.—Causes of crib-biting.—Symptoms.—Consequences.—Vomiting.

PARROT mouth is not well developed until horses have attained seven or eight years of age. I have examined four and five year old animals in which the lower jaw was obviously shorter than the upper, and so striking is this defect in some cases, that the general outline of the jaws, without further examination of the teeth, indicates the deformity. A veterinary surgeon must caution the purchasers of such colts as to the consequences of trusting the animals at any time to their own resources in gathering food in the field. If the pasture is bare, they must starve.

Whether the lower jaw be short or narrow, we find that, as the molar teeth grow, there are serious deformities which interfere with mastication. With a short lower jaw, there is imperfect apposition of the molars as well as of the incisors, and the first molar on either side of the upper jaw is apt to indicate excessive growth at the anterior part, and the same happens with the back part of the last grinders on the lower jaw. These projections may attain considerable length, and inflict injury on the cheeks and tongue.

By far the most common irregularity, from imperfect wear of the teeth, depends on the breadth of the upper jaw as compared with the lower. Frequently the outer margins of the superior molars, and the inner margins of the lower, become sharp and jagged. This tends to induce excoriations in the mouth: the movements become more and more limited, and the irregularities more marked. Bouley refers to a specimen in the Alfort Museum, in which the tables of the teeth form such inclined planes as to be parallel with each other, and crossing each other like scissor-blades. The cause of this, according to



Professor Bouley's observations on the specimen, appears to have been caries of two molars which, having limited the action of the jaws to one side, led to growth on the opposite side of the teeth, and gradually the confined movements of the jaws favoured the full development of the deformity.

The lower molar teeth, being smaller than the upper, are occasionally most worn, and this often leads to excessive wear of the middle molars on each side, the anterior and posterior ones remaining larger. The middle molars may be worn down to the gums, and the latter then sustain injury.

I have before mentioned, that from a molar tooth not being worn over its whole surface, a portion may exceed a natural length. This is sometimes the case with an entire tooth when the opposite one is absent.

During my experience in Scotland, I have met with a large number of colts, two, three, and four years of age, suffering from the displacement of a temporary molar, the non-eruption of the permanent tooth which should have taken its place, and the production of much irritation from food and other substances entering the empty socket.

The injury resulting from the displacement of one molar tooth, and excessive growth of its corresponding one, was noticed by me in the third article on soundness, and it is evident that all diseases of the teeth render animals unsound. Molar teeth may, however, be removed, and if recovery is complete, it is clearly the duty of the veterinarian to pronounce an animal sound in which the defect is but the absence of a tooth. On one occasion in my experience a difference of opinion occurred in this matter, and a veterinary surgeon was disposed to reject a mare whose only imperfection was the want of the second molar tooth, which had been removed for caries.

If fistula of the face exist in connection with diseased teeth, or from other causes, an animal must be rejected. The removal of the diseased tooth in such a case restores the horse; and, in one instance in my practice, a bay horse, that had been purchased for a trifle at North Allerton Fair, realised a good profit after having been successfully operated upon for facial fistula.

Fistula of the face may be due to lesion of the parotid duct. The veterinary surgeon notices the wet condition of the hair, and a circular sore, in the centre of which there is an opening. On giving the animal food, saliva flows from the opening, and the discharge is most abundant when dry food is being masticated. A facial fistula due to such a cause is of a more serious nature than the form arising from a diseased molar tooth, and the length of time that the lesion has existed may be indicated to some extent by the solid and smooth appearance of the margin of the fistula. I have known animals suffering from this lesion pass from one veterinary surgeon to another, and disposed of by their owners at various prices.

**CRIB-BITING.**—On examining the teeth of a horse, with a view



to determine his age, we sometimes find that the incisors are worn irregularly. The upper ones are rounded at their anterior edge, and the lower ones have the front surface of the crown much rubbed down. Horses with their teeth in this condition are, as a rule, crib-biters.

The habit of seizing the manger, bending the neck, and emitting a noise similar to that of eructation, has been termed crib-biting. The expression 'wind-sucker' has been applied to the same habit of the horse when the teeth are not applied against a solid object in the act of sucking. Crib-biting and wind-sucking have been defined conditions in which there are morbid movements of the œsophagus, derangement of the stomach and intestines, with eructation, or with deglutition of air.

Many continental observers have turned their attention particularly to these defects, as they constitute redhibitory vices in most countries. Thus, in Hamburgh, a horse may be returned as a crib-biter or wind-sucker within five days from the date of purchase; in most of the German States, within eight days; in Wurtemberg, within ten; and Gerlach recommends that not less than from eight to ten days' time should be allowed for the return of the horse. In some countries—such as in France, Baden, &c.—wind-suckers alone can be returned, as the true crib-biter can be told by the teeth, and the purchaser should exercise proper judgment or act on good advice in selecting a horse.

In criticising the opinions of those who have discussed the nature of the act of crib-biting or wind-sucking, Gerlach says, That the condition is at all times one and the same—viz., an act of swallowing air. Some horses swallow little and others swallow much. The grounds on which this opinion is based are as follows:—

*Firstly*, It is a fact that crib-biting is a voluntary act, and it is quite opposed to our knowledge of physiology that any act of disengaging air from the stomach should be under the control of the will. This is more especially unlikely in the horse, in which animal the act of vomiting cannot occur with the normal stomach. Young horses, in the most healthy condition, acquire the habit very rapidly, and this cannot be accounted for by supposing the sudden occurrence of disease of the cardiac end of the œsophagus, which is found in a few inveterate cases.

*Secondly*, The swallowing of air is known to occur in some animals, in which tympanitis occurs, very rapidly; and this affords us the most positive proof on the subject. Crib-biters liable to tympanitis are sure to suffer from gaseous distension of the intestines if allowed to crib; but the accident is prevented by tying a strap round the neck, or otherwise stopping the act of crib-biting.

It is evident that the abnormal condition of the œsophagus and of the stomach are rather results than causes of crib-biting. Post-mortem examination has revealed occasionally dilatation of the gullet, especially in its cervical portion, enlargement of the stomach, thicken-



ing of its coats, disease of the pylorus, and even affections of the liver. Three cases only have been recorded in which the tympanitis increased, or had any tendency to occur, on causing crib-biters to stop in the act of indulging in their accustomed vice. Gerlach has specially referred to these cases as quoted by Lichte and Nicklas, and doubts the facts owing to their having been given on hearsay.

On this question Bracy Clark says: "How this extraordinary propensity becomes first created, has not been, we believe, much attended to; and with some it appears to arise naturally, as though the sucking of air gave them pleasure, or a relief from some sort of suffering; and at first we imagined that pains of the stomach from acidity or other causes might create it, as we see horses eat dirt or gnaw the walls to alleviate unpleasant feelings of this organ. But bad digestion and foul feeding are probably more often a consequence than a cause of this malady; and we observed that horses at all disposed to it may be easily led into it by the practices of the grooms in cleaning them, of which we can have no doubt; for if they clean them before the manger, and irritate them with too severe a comb, and in parts where they cannot endure it, they seize upon the manger for a counteraction to their sufferings, and in doing this they first get a habit of it, and which may afterwards extend to the removing of other pains or distressful feelings. By this means, and especially if the grooms—and some have a happy knack of this—after every bite, put in a blow or stroke of the neck when following each other in regular succession, they thus create a vice which may or may not continue afterwards, according to the situations or circumstances attending the individual. Some are said also to get it by imitation of other horses; whether or not the same practices of the groom applied to several horses in the same stable should not be rather apprehended to be the true cause, we are not assured; but in one instance we think we observed this satisfactorily enough to be the cause, though it passed for imitation."

My experience would indicate that this troublesome vice occurs most in young horses that are well fed and insufficiently worked. They get fretful, and bite or lick the manger, and soon contract the bad habit. I have known a confirmed crib-biter cured on being purchased by a cab-proprietor, who worked the animal all day, and being tired when taken into the stable, would devour its corn and hay and lie down to rest. That animal is at present in good condition, whereas, when moderately worked, and usually in the stable, its appearance was that of a starved, unhealthy, and ill-used horse. There is no doubt a special predisposition to the habit, as all horsemen have seen, any number of animals treated as Bracy Clark asserts, and who bite the manger when being rubbed over with a whisp or rubber, and yet never took to crib-biting.

The act of sucking air is observed under different circumstances. As a rule, crib-biters require a manger, rack, or stall-post to lay hold of. They avail themselves of any prominent object, even as small as a nail or ring, and in the absence of all these they may press with



the chin against a knee, or grasp the halter or bridle-rein. Wind-suckers need no resting-point ; and in examining horses for this defect, veterinarians must be careful not to mistake a habit which has been mentioned by Nicklas, which most practitioners have seen, and which consists in a noise produced in rubbing the lips firmly against each other. Nicklas says this is playing with air, and not swallowing it. I have seen it in cart-horses and other animals that were not crib-biters or wind-suckers, and the noise made in smacking the lips was considerable.

In the act of crib-biting the act of respiration is momentarily suspended, the glottis closed, the head flexed, neck arched, and muscles of the chest and abdomen fixed. At this moment there is a noise produced in the pharynx very similar to that of eructation. The larynx and hyoid bone are depressed and fixed, the pharynx expanded, and the air which passes into this is on the relaxation of the parts partly swallowed and partly returned by the nose. Gerlach says that, according to the dexterity with which the act is effected, is little or much air swallowed, and some horses become rapidly tympanitic.

When horses first begin to crib-bite, and sometimes inveterate crib-biters, they only indulge in the practice at intervals ; some whilst eating, others after feeding, and others when standing in the stable without food before them. During attacks of acute disease the animals do not attempt the act.

Crib-biters are very liable to attacks of colic. When the oesophagus has undergone changes there is a tendency to choking, and in some instances the animals become subject to vomiting. Crib-biters are unfit for hard work, and from the weakened condition of their system are liable to other diseases.

Crib-biting has been looked upon both as a vice and as an unsoundness.

Mr Oliphant remarks:—"Crib-biting, being an unnatural sucking in of the air, must be to a certain degree injurious to digestion, must dispose to colic, and so interfere with the strength and usefulness and health of the horse. Some crib-biters are good goers, but they probably would have possessed more endurance had they not acquired this habit; and it is a fact well established, that as soon as a horse begins to become a crib-biter, he, in more than nine cases out of ten, begins to lose condition. He is not to the experienced eye the horse he was before. The wear of the front teeth, and even the frequent breaking of them, makes a horse old before his time, and sometimes renders it difficult or almost impossible for him to graze.

"Crib-biting, which has not yet produced disease or alteration of structure, is *not* an unsoundness, but is a vice under a warranty that a horse is 'sound and free from vice.' Thus, where an action was brought on the warranty of a horse which had been sold for ninety guineas, the question was, whether crib-biting, which was the vice in question, was such a species of unsoundness as to sustain the



action. The horse had been warranted sound generally. Some eminent veterinary surgeons were called as witnesses, who stated that the habit of crib-biting originated in indigestion; that a horse by this habit wasted the saliva which was necessary to digest his food, and that the consequence was a gradual emaciation. They said that they did *not* consider crib-biting to be an unsoundness, but that it might lead to unsoundness; that it was sometimes an indication of incipient disease, and sometimes produced unsoundness where it existed in any great degree. Upon this Mr Justice Burrough said: 'This horse was only proved to be an incipient crib-biter. I am quite clear that it is not included in a general warranty,' and the plaintiff was accordingly non-suited.

"In a later case, a horse was bought warranted 'sound and free from vice,' and an action was brought against the vendor on the ground of its being a crib-biter and wind-sucker. Veterinary surgeons were examined, who said that the habit of crib-biting was injurious to horses; that the air sucked into the stomach of the animal distended it, and impaired its powers of digestion, occasionally to such an extent as greatly to diminish the value of the horse, and render it incapable of work. Some of the witnesses gave it as their opinion that crib-biting was an unsoundness; it was not, however, shown, that in the present instance the habit of crib-biting had brought on any disease, or had, as yet, interfered with the power or usefulness of the horse.

"Mr Baron Parke told the jury, that to constitute unsoundness there must either be some alteration in the structure of the animal, whereby it is rendered less able to perform its work, or else there must be some disease. Here neither of those facts had been shown. If, however, the jury thought at the time of the warranty the horse had contracted the habit of crib-biting, he thought that was a vice, and that the plaintiff would be entitled to a verdict on that head. The habit complained of might not indeed, like some others (for instance, that of kicking), show vice in the temper of the animal, but it was proved to be a habit decidedly injurious to its health, and tending to impair its usefulness, and came, therefore, in his lordship's opinion, within the meaning of the term *vice*, as used on such occasions as the present."

The vice of crib-biting is one of those defects which indicate the propriety of limiting the period during which an animal may be returned. Some cases are apparent, as already said, from the condition of the teeth, but others require close observation, and can only be detected by watching animals when they are not suspecting that any one is near them. The habit is, however, contracted so rapidly, that it is not fair to the seller to permit a question to arise as to the existence of such a defect a month or two after purchase.

There are not many diseases of the digestive organs which give rise to disputes; it is only those affections that are apt to give rise to symptoms of disturbance at intervals, and which may endanger life.



**VOMITING.**—Vomiting in the horse may be a symptom of over-distension of the stomach, but in all the cases in which it has recurred in the horse, disease has been found at the cardiac end of the œsophagus. The act of vomiting is eminently an unnatural one in the horse.

But before entering on the question why the horse rarely vomits, I may describe this act in animals in which it occurs freely. The first symptom is the expansion of the chest—drawing air into the lungs so as to fix the ribs and enable the diaphragm to act from them. Then the muscles of the belly act, and at the same time the neck is shortened, its muscles grow rigid, there is a regurgitation in the gullet and ejection through the open mouth. It is found that the fluids usually secreted in moderate quantity in the throat, increase in quantity under the influence of the emetic, and it is probable that this is destined to favour the ejection of materials thrown up from the stomach. When the normal contents of the stomach have been dislodged, and vomiting continues, bile and even stercoral matters are thrown up, proving that the antiperistaltic movement extends even beyond the pylorus along the intestinal tube. The action of the stomach, though not essential to the act of vomiting, tends to close the pylorus, and this favours the pressure of the contents against the open gullet. It is very remarkable how slight the contraction of the stomach is in vomiting, and Francis Bayle demonstrated, in 1681, that if a finger is introduced in the stomach of a dog during the act of regurgitation, there is no perceptible effort noticed on the part of the organ; moreover if the muscles of the belly are rendered powerless by a large incision through them, vomiting cannot occur. Chirac, Schwartz, Hunter, and lastly, Majendie, confirmed the views entertained by Bayle. Majendie's experiments consisted firstly in causing the stomach to be exposed through the walls of the abdomen in a dog, when, from the injection of tartar emetic in the veins, no contraction occurred in the organ, and the contents were not expelled. The second experiment consisted in tying a pig's bladder, in the place of the stomach, filled with liquid, which was expelled by the action of the abdominal walls. The latter experiment simply proved that emesis, or the desire to vomit, occurred without the presence of a stomach in the body, and it is not a fact that the organ is incapable of action, or in no way affected by an emetic, because when the intestinal opening or pylorus has been tied, the unaided stomach proves sufficient to accomplish the rejection of its contents.

The action of the œsophagus has to a certain extent been overlooked in the act of vomiting, though Legallois and Beclard observed its active contractions. No one has denied its antiperistaltic movement, but its contractions are seen to be very violent in cases of impaction of some foreign substance close to the stomach. Liquids are then swallowed till the lower end of the œsophagus is distended, and by a forcible contraction of the latter they are soon expelled.

The conditions favourable to vomiting are susceptibility to the



action of emetics or any influence capable of producing nausea, a moderately distended state of the stomach, and favourable form of the œsophagus, especially at its cardiac end. That the distended state of the stomach, independently of any decided sickness, is sufficient to produce regurgitation, is proved by the remarkable cases of so-called rumination in the human subject. Several instances are recorded in which, either under the control of the will or involuntarily, food is returned to the mouth after a meal.

All the persons who have referred to the subject of the difficulty of vomiting in the horse, have overlooked, to a great extent, the point which my brother has justly insisted on, that the emesis, or the tendency to vomiting, is not readily excited in this animal. Nevertheless there are cases in which it is observed, and vomiting is possible. These are, 1st, Cases of *inordinate* distension of the stomach; 2ndly, Cases of dilatation of the lower end of the œsophagus; 3rdly, Cases of obstruction to the pylorus; 4thly, Ruptures of the stomach; 5thly, Hering refers to cases of vomiting due to ulceration of the mucous membrane of the stomach.

The mechanical impediments to vomiting, insisted on by many physiologists, with the exception of two, and which are the disadvantageous direction of the œsophagus into the stomach, and the tendency of the mucous membrane to fold on itself and plug the cardiac orifice, are all false.

Many have described a spiral valve at the cardiac opening of the stomach, and I here reproduce a drawing of it from Leyh's *Anatomy*, but no such valve exists. It is simply a false appearance in a *dried* stomach, from the folds of the mucous membrane curling spirally when pressed upon by the distending air.



The sphincter which Bertin, Lafosse, Fluorens, and many others have taken for granted as existing at the lower end of the œsophagus of the horse, certainly does not exist.

The pathological facts, which I have carefully collected and examined, prove to me, firstly, that horses are liable to vomiting, and may manifest the disposition at intervals, or any time when the stomach becomes distended, if the mucous membrane has space enough not to be thrown into folds at the cardiac orifice. The subjoined cut indicates a dilatation of the lower end of the œsophagus, which is indicated during life by the troublesome and frequent rejec-



tion of the contents of the stomach. There is no doubt, however, that in cases of inordinate distension of the gastric cavity, especially coupled with spasm of the duodenum, regurgitation occurs. We had a case lately in the practice of the New Veterinary College, in a horse which vomited during the paroxysms of a violent attack of colic. This horse recovered. The late Mr John Field relates a very interesting case of vomiting from distension of the stomach and spasm of the duodenum.



But veterinary surgeons are well aware that in acute vomiting in cases of stomach staggers, the stomach has already given way, and by this the mucous membrane forming hernia, through the laceration, any obstruction at the cardiac orifice is overcome. The close manner in which the organs are applied to each other in the abdomen explains how, with an inert and indeed, torn stomach, by the action of the abdominal walls, ejection readily occurs. Those who may be incredulous that, after the walls of the stomach having given way, there could be any vomiting, may be reminded of a case referred to by Longet, in which a woman, having swallowed sulphuric acid, suffered from violent vomiting up to the time of her death, after which it was found that the walls of the cavity had been completely destroyed.

The frequent ruptures of the stomach have been ascribed to active muscular effort of the organ, but I regard them as due to the pressure of the impacted mass on the paralysed coats. I say paralysed coats, because all hollow organs, unduly distended, suffer a kind of paralysis, or are stretched beyond the limit within which they can act. Doubtless when the muscular coat has partially given way, the pressure during the efforts to vomit would increase the hernia of the mucous lining, and favour the regurgitation.



*Case of Hæmoptysis.* By DANIEL M'GREGOR, Assistant to Mr Chas. Hunting, Seaton Delaval, Newcastle-on-Tyne.

As this lesion is of rather rare occurrence in our domestic animals, it may be of some interest to the readers of the *Review* to relate the following case:—

On the evening of the 4th September last, I was summoned in great haste to attend a bay mare, the property of Mr Wharnir, farmer, Seaton Delaval, which was stated to have taken suddenly ill, and that some kind of frothy fluid was running from both nostrils. On my arrival I found a continuous stream of frothy arterial like blood issuing from both nostrils, which proceeded from the lungs, as was evident by the gurgling sound in the trachea, and the flow not being intermittent as in a case of hæmorrhage from the stomach. On making inquiries of the hind, I learned that the mare had been that day ploughing some very hard stiff ground, and being a free worker, she had exerted herself very much. The day's work being done, she was taken into the stable, seemingly in her usual health, commenced eating her corn, when all at once she was noticed to stop eating, commenced shivering and perspiring freely. On the hind going up to her head, he, for the first time, noticed the flow from the nostrils. It was then I was sent for. Calling for a basin, I received, in the space of 20 minutes, about a gallon of blood.

As the animal was sinking fast from the large quantity of blood lost, I saw that the only chance of saving the animal's life was by prompt and energetic treatment.

I immediately gave an ʒvjiii ball of aloes which I had with me. Had both sides well blistered, bandaged the legs with flannel. I then tried if she could drink some cold water, but she took very little of it. Ordered the men out of the stable, that she might be kept perfectly quiet for a time.

In half an hour after (having gone home in the interval for some medicines), I looked in, found she was still sinking. Hæmorrhage unchecked, though somewhat abated; pulse imperceptible at the jaw, heart's action weak and indistinct, body covered with a cold sweat, legs bending under her as if going to fall. This was about 10.30 P.M. I had her loosed from the manger, and gave, in a pint of water, plumbi. acet. ʒjss.; opii pulv. ʒj., and left her again quiet and dark. 11 P.M.—Still bleeding, though slightly; very weak, nearly fell four times, but with an effort each time regained her feet, leaning against the side of the stall for support, head lying in the manger, legs bending under her every few minutes, the whole body of a death cold feel. 12 P.M.—Much the same; still bleeding, though now only in drops. A short time after I left, and gave orders that she was not to be disturbed until 2 A.M. I left a ball to be given then, composed of plumbi. acet. ʒj.; opii. pulv. ʒj. (I preferred giving it in the form of ball as being easier administered than in draught, and not disturbing the animal so much.) If alive at 4 A.M., I was to be called for.



At 4 A.M. I was called. On visiting the animal, I found the hæmorrhage checked, but was in a very weak state; pulse imperceptible, heart's action could be heard, but it was impossible to make out the number of beats per minute, being very indistinct. I had a pail of cold water held up to her head, of which she drank greedily, but I would not allow her much at a time; tied the head up so that she could easily reach the manger, but no lower. Gave orders that she was to get no hay or corn, but to be fed wholly on cold bran mashes and gruel; not to disturb her unnecessarily, but to keep her as quiet as possible. Gave her the former powder in mash twice a-day. On calling on the evening of the same day found her much improved. 6th Sept.—Still improving, heart's action more distinct, made out the beats to be 58 per minute, pulse still imperceptible at the jaw, eyes sunken, pale mucous membranes, legs and ears very cold, kept on the bandages. 7th.—Pulse to-day can be felt, but very weak and soft, surface of the body has a more natural feel, but extremities still cold, continued same treatment. 8th Sept.—Still improving, changed the powders, gave small doses of gentian, still to be fed on soft food. The animal continued daily improving.

On the 20th of September I had her turned out to grass during the heat of the day, and on the 29th was put to light work. The animal has continued up to the present date in perfect health.

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*Wound of the Head implicating the Parotid Gland, Fauces, etc.*  
By the Same.

ON the morning of Dec. 5, I was summoned to see an aged grey horse, in one of the Seaton Delaval pits, which was said to be suffering from colic.

On my arrival, I was somewhat surprised to find the animal bleeding profusely from both nostrils, especially the left, and a large wound visible on the right side of the head, below the ear, and a little above the angle of the lower jaw. The following is the history obtained from one of the workmen:—On the morning of the accident, the animal appeared restless and uneasy while at work, frequently rolling about as if in great pain. In one of those paroxysms, by some means or other, one side of the harness entered the head, in the situation above mentioned. The first intimation the workman had of this occurrence, was by the strange conduct of the animal. On examining him closely, he found the hame stuck fast in the head. He attempted to withdraw it, but could not, and it was only with the assistance of another that it could be removed, so firmly was it fixed. I was shown the hame, and found it covered with blood for about six inches, showing that it had penetrated the head to at least that extent. On examination, I found a lacerated wound on the right side of the head below the ear, and immediately above the angle of the inferior maxillary bone, following a downward and inward course,



lacerating the parotido-auricularis muscle, parotid gland, internal masseter muscle, fauces, and velum-palati, entering the nasal cavity.

Having satisfied myself as to the nature and extent of the injury, I gave a ball of aloes, had the wound well washed with cold water, ordered the animal soft bran mashes, and to be drawn from the pit in the evening, or sooner if possible, as under ordinary circumstances, no horse can be drawn from the pit during working hours.

*Dec. 6.*—As it was impossible to have the animal drawn from the pit last night, owing to some injury done to the shaft, which had to be repaired before morning, I found it in the same position as last evening.

He was very feverish, pulse 80, breathing hurried, body hot, ears and legs cold. Bled him to 6 quarts, had him given some cold water to drink; in his attempts to swallow, the water, flowed freely from both nostrils and wound, thereby showing the communication between the fauces and nasal cavity. After drinking, the animal attempted eating a little hay which was in the stall—I say attempted, for on watching him closely, I found that he only grasped the hay with the incisor, and then dropped it, not a particle ever reaching the molars. I ordered him a bran mash, and to get some flour, and give him gruel in the morning.

*Dec. 7.*—Much better, pulse 60, breathing natural, slight flow of blood and mucous from the nostrils, saliva escaping from external wound; had taken the mash and gruel.

He was drawn from the pit in the evening, when I ordered a light linseed meal poultice, to be applied over the external wound, covering the parotid gland, which was very much swollen. I had a leathern tube made after the fashion of those used at the New Veterinary College, and with it injected the nostrils with a weak lotion, zinci sulphas. A large quantity of flour returned with the injection. Continue the gruel, and the horse to be kept quiet and dark.

*Dec. 8.*—Much the same as yesterday, removed the poultice, injected nostrils and wound with the lotion. A muco-purulent discharge from nostrils and wound. Continue the poultices and gruel.

*Dec. 9.*—Healthy suppuration established. Wound and nostrils discharging pus freely, pulse 60, feeble; has taken but little gruel.

*Dec. 11.*—Fever much increased; pulse 75, full. The animal seems suffering much pain. Discharge from nostrils and wound profuse, and very foetid. To have a purgative ball, with the following draught in two hours:—

R̄ Tinc. Opii,	.	.	℥i.
Sp. Eth. Nit.,	.	.	℥iv.
Aqua ad,	.	.	Oijj.

Changed the lotion for one of zinci. chlor.

*Dec. 13.*—Is decidedly better; discharge much less; breathing tranquil; pulse 55; drinking a little gruel. Continue treatment.

*Dec. 16.*—Still improving, discharge less; not foetid; wound granulating well—continue treatment.



Dec. 19.—Is convalescent, to have gruel and bran mash three times a-day—discontinue all other treatment.

Dec. 26.—Power of jaws returning; eats a little hay slowly. External wound healed. Little discharge from nostrils.

1863.—Jan. 3.—Discharge from nostrils ceased. Can eat any kind of food, and seems in perfect health.

I have been led to submit the above case to the readers of the *Review* for two reasons:—Firstly, on account of the rarity of the accident; and, secondly, from the good recovery the animal made under the means used. My first impression, on seeing the animal, was, that all the structures in the vicinity of the articulation were more or less injured, and the joint itself laid open. That the former was not the case, was evident on examination, but how the important blood-vessels escaped injury is unaccountable. As for the latter I can say but little. I have frequently watched the animal for a considerable time attempting to eat; evidently he had a desire for food, by his picking up the hay and attempting to chew it, but being unable to do so, he returned it, without even a particle of it being swallowed. This he did for several hours at a time. From this inability to masticate, I consider that the jaw must have been injured in some way. Although the animal made a good recovery, he was very much emaciated from the inability to masticate, but is now rapidly improving in condition.

*On the Treatment of Colic; being a Reply to "Argus."* By Professor GAMGEE, Sen., New Veterinary College, Edinburgh.

IN the *Veterinarian* for the current month of January I perceive a communication headed as above, in which my practice and teaching on the special disorder "Colic" is made the subject of stricture.

As an exception to a rule I usually observe—viz., not to notice an anonymous antagonist—I shall in this instance explain, as well as I can, whatever may have been unintelligible in my former communication, which forms the subject of the writer's criticism.

So highly important do I consider the subject which it was the object of my former paper to elucidate, that I shall spare no effort to place it, so far as my own experience can avail, in its proper light.

The writer of the article above referred to, calling himself "Argus," in his second paragraph, speaks of India, without, however, affording any evidence to show whether he is residing there, or writing under the skylight of a second storey in a London suburb. The writer says, "Cases of colic are very common here in India, and I necessarily treat a large number of them." It is known that colic is a frequently occurring and commonly fatal disease in horses, but it is by no means equally clear that the writer in the *Veterinarian* "necessarily treats a large number of them."



In the third paragraph he says, "Mr Gamgee treats all cases of colic according to one system." So I do, but pursue sufficiently varied means, according to estimated requirement, and as such means are available at the moment; hence I attribute the success generally attained.

The courtesy with which professional readers of the *Edinburgh Veterinary Review* have always corresponded with its editor, from India, and also from Australia, the Cape, and other colonies, affords a reason why I prefer to err, if I do so, on the right side, by entering more at length than I were disposed to do in this reply to an anonymous author.

The writer accuses me for limiting my treatment of colic too much to the use of clysters and aperients, and because I condemn the employment of "opium, ether, &c., and external stimulants."

Again, he says "I frequently administer aloes, but cases often present themselves in which it would be injudicious to use this drug, if not absolutely dangerous." Here I fail to discover a reason why it would be "injudicious," whilst the "if" which follows neutralises the phrase. In very simple cases, he says, he gives a pill composed of "camphor and ginger, and that is all that is required to set the animal right."

Who ever asserted that all horses affected with spasmodic pain in the bowels would die unless submitted to treatment?

Experience teaches that, when neglected, many do die, and a still greater proportion if improperly treated than if left to take their course.

If the writer could recall to mind his schoolboy days, he would perhaps remember some occasion when, after eating to excess of unripe plums, that spasmodic colic, in a degree distressing, was the consequence. As pain became intolerable, the boy rolled about, perspired, placed himself, belly downwards, across the top bar of a wooden gate, finding momentary relief from the posture and the pressure, and that without other means recovery resulted; yet if the sufferer had known the real danger, and had sought the aid of a physician, the danger would have been lessened, and speedy relief given. I have imported this comparison to show that many spontaneous recoveries result: it is the prerogative of nature, through her self-adjusting laws, to restore the balance in the system when disturbed through any cause.

The writer goes on, and after extolling camphor and ginger as all that is required in the case, says, "Why, then, should we give from five to eight drachms of aloes?" adding, "where there is costiveness, I order four or five drachms." I am aware of the measures that have been adopted at different epochs, and in different countries, in the treatment of colic in horses; I have seen the effects of the old empirical customs, and like the writer, I presume, was instructed under the light of modern English teaching; but being one of the many who have worked my way, using the faculties with which I am endowed, I



looked ahead, and astern too—thought and acted in the way that reason and experience led me to ; and I learnt that a large number of deaths in horses was occasioned through stomach and bowel affections, which were ill understood and irrationally treated.

I began to see, think, and by degrees discovered, that wrong influences were assigned, and real causes escaped observation ; and also, that the means resorted to frequently augmented the painful condition of the horse, and sealed his doom in death.

With such views for my guidance I pursued my line of practice, and the good results derived have been my ample reward. Nor am I chargeable for having withheld from my fellow-workers the means taken ; I have published them—taught and shown ; and for several years past pupils have gone forth, furnished with a sound line of procedure in the treatment of colic, so that they will be saved the mortification of having to find their way from one erroneous step to another, until the opportunities presenting at the beginning of a career have passed, not to return.

When the writer drew the comparison between the doses of aloes which he gives—viz., 4 to 5 drachms—and the larger average dose mentioned by myself, he would have done more justice to the subject if he had taken into account the variety of circumstances which, it is expected, professional men are attentive to. Amongst the horses that have been my patients—under variously complicated disordered stomach and bowels, in which spasmodic colic was present as a symptom—are some of the largest and most powerful horses in the world ; whilst the way in which they are fed and worked render a more ample dose necessary than would be admissible in the small horses in India, or by any horses in an Indian climate. I have long since expressed myself sufficiently against drastic purgatives, such as are commonly given to horses, and it may be seen that I always prescribe and give the milder, Cape, and soccotrine extract. However, I never intended my separately published papers, treating on such an extensive and important subject as that of diseases of the stomach and bowels of horses, to be exhaustive. I said nothing about the smallest amongst adult horses, and left untouched the consideration of bowel disorders in foals and young growing stock, because these, I considered, require to be distinctly dwelt on, and are only deferred, amongst other subjects, for lack of time.

The next and chief part I have to notice in the paper before me refers to clysters, and the way by which the writer insists on extracting the contents of the rectum. He says, “ I use warm water at the temperature of about 100° ; Mr Gamgee advocates a temperature of 80°.”

Then, speaking of that absurd custom, “ back-raking,” “ Argus ” says, “ If the rectum be full of hard dry pellets of excrementitious matter, enemas cannot be productive of such good results as we desire, and particularly if the enema be given with a *funnel-tube*, and the water allowed to gravitate by its own tendency.”



Though I have not succeeded in bringing "Argus" over to my views and doctrines on the cause, character, and proper mode of treating colic in horses, I am sure I shall be more successful in leading him to believe what I am about to state. The writer tells us he orders this and that thing to be done; whilst I say, I do and have done such a thing with a given result. He has not done, but ordered—a statement in some measure explanatory of the difference between us; hence, I say, and "Argus" will not deny it, that he has never administered a clyster in his life by means of my *Funnel-Tube Enema Instrument*. Nay, I even seriously doubt whether the writer has ever administered a clyster to a horse at all; or, if he has done so, it has been in a thoughtless way; for the difficulty he portrays never happens, and never can occur. Not only is no forcing of the fluid into the rectum not necessary, but very objectionable; there is no way by which fluid can be so easily conveyed into the rectum of the horse as by the instrument of which I formerly gave a description (and which I have modified, after long practice, and many experiments); on the merits of these I have more to say, shortly; but since the writer has made this incidental part of my system a prominent feature—I may say the battle-horse—in his essay, and asserts his preference for Reid's syringe, which, he says, "if properly managed is an admirable one," I must allude to it. I never knew before that there was any special art required in managing that huge syringe—the chief requirement seemed to be that of physical power to carry it, and to force the pump, unless the greater difficulty was found to get people to disburse the necessary number of pounds and shillings to purchase it.

There is one part of my treatment on which I have laid stress, and with which I am glad to see the writer agrees—viz., the abstaining from bleeding; therefore we will shake hands on the concord. There is clearly one point gained, which, I venture to believe, is the first of a series.

In alluding to the small average number of deaths amongst patients from all diseases in his own practice, the writer is struck by my assertion that I lose none from colic; and I take his doubt in perfect good part, for, without attributing misrepresentation on my part, it may be argued that I deceive myself: let it, however, be borne in mind that I do not claim credit for so complete an immunity from failure. Several cases of death from colic would in no appreciable degree detract from a large general success. Moreover, we often say that exceptions prove the rule; and if I could report some failures as occurring amongst the patients I treat under severe attacks of colic, it would seem to show candour; but, until they occur, I cannot report them, and if they did happen they certainly would be published; for I have not been so far removed from healthy competition that others would not have reported such cases for me, in the face of my statements, published at different periods. That nothing has been shown, because there is nothing to invalidate statement of facts as



they come to pass, must be taken, beside my reports, for what they together are worth, to all who seek information on the treatment of colic.

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*Two Cases of Murrain (Aphtha Epizootica) in the Human Subject.*

By J. B. HISLOP, F.R.C.S.E., Houston, Renfrewshire.

ABOUT the end of August last, Mrs X., the wife of an extensive farmer, came under my care, on account of an eruption of bright red spots, one-eighth of an inch in diameter, covered by a thin, white desquamation, which was thickly scattered over the feet, legs, thighs, and lower part of her body, leaving only minute interspaces of sound skin.

As Mrs X. had, during the last three years, suffered from several attacks of hepatitis, followed by jaundice, and was extremely liable to derangements of her liver and digestive organs, I concluded that the eruption described might be due to some such cause, and therefore prescribed alterative purgatives, with five grains of bromide of potash, thrice daily. This treatment made no impression on the symptoms.

On a subsequent visit to my patient, I found her husband complaining of sore mouth and throat. Upon examination, I found his lips, lining membrane of his mouth, throat, and tongue, studded with small ulcers, giving off a white slough, which left behind a clean but highly sensitive cup-shaped cavity. His forehead was also covered with an eruption similar to that on the lower extremities of Mrs X.

As my suspicions were considerably excited by this combination of symptoms in parties so closely connected, I made strict inquiries, and found that the only cause that could be assigned for this singular affection was the circumstance that the whole of Mr X.'s cows had just had the murrain—a very contagious disease of cattle, affecting their lips, mouth, and particularly the under part of their tongue, with vesicles and ulcers analogous to those observed on Mr X., who informed me that, when in the act of examining one of the cows which was suffering much from the disease, and while pressing back its lips, he observed two or three of the vesicles on the upper lip to burst, and emit the matter to a considerable distance, and that a portion of this had been received on his hands and cheek. Knowing the high moral respectability of the parties, and taking all the circumstances of the case into consideration, I came to the conclusion that they had been inoculated by the matter discharged from the mouths of the affected cattle—Mr X. directly, and Mrs X. by the use of the milk, in which the matter was unavoidably mingled; and this opinion was strengthened by the fact that others who had been employed about the byre had suffered from similar symptoms, but to a less extent. I now put both my patients under the internal adminis-



tration of bichlor. hyd. c. iod. pot. in solution, and touched Mr X.'s ulcers freely and frequently with nit. argenti, giving also a gargle of chlorate of potash to be used frequently.

On talking over the matter with Mr X., I find that the only way in which the introduction of the disease to his cattle could be explained, was the fact that they had been fed upon clover which grew  $2\frac{1}{2}$  miles from their own steading, and that close to this clover field a dairy of cows was grazing which had the disease very badly.

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*The Case of the East Lothian Hounds.* By Professor GAMGEE, Sen.  
New Veterinary College, Edinburgh.

THOUGH I do not feel myself called on to reply to such an article as was admitted into the *North British Agriculturist* on the above subject in its issue of the 7th inst., I beg it to be distinctly understood that silence does not give consent.

I should not think of sustaining a controversy, either verbal or by writing, with any man who cannot subscribe his own name, and that an acceptable and honourable one. No "Burntisland Blacksmith's" signature, or a "Scrutator," will drag me into the mire, though I am ready to appear fairly above board to prosecute a scientific inquiry, for the good of science in its bearing for good purposes. Whilst I keep my ground and refer to my two published papers on the subject, I am ready to learn more when the opportunity offers.

In the meantime, a note just received from a scientific friend, whose name I shall not mix up with any anonymous correspondence, so expresses my own views, that I append it:—

"MY DEAR SIR,—I have carefully read the article in the *North British*, in which the writer, setting out with a profession of impartiality, gives vent to so much one-sided abuse, that no one can for a moment be deceived by the false pretence. All his cavilling only tends to strengthen your philosophical proposition, 'hitherto we have only seen consequences; causes and their relations are what we have now to learn.'

"Every consideration, personal and professional, appears to me to suggest the course which I presume you will be inclined to adopt, viz., to abstain from reply.

"I cannot suppress one reflection—that the editor of the *North British* should publish such a disreputable letter.—Yours, &c."

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*Pathological Specimens.*—Exhibited by Dr CRISP before the  
Pathological Society, January 20, 1863.

1. A NODULATED bony concretion taken from the stifle joint (knee) of a horse: it weighed 318 grains, measured  $2\frac{1}{2}$  inches in length, and  $1\frac{1}{2}$  in breadth. The animal when six months of age was injured by



slipping down when playing with another colt, and was lame from this period, but it continued to plough, and do slow agricultural work for six or seven years, when it was killed; the concretion was found in the cavity of the joint. Dr Crisp thought it probable that a portion of cartilage was partly detached by the injury, that ossific matter was gradually deposited, the substance afterwards becoming free.

2. The crop of a turkey enormously distended from an accumulation of dry, tough grass, which the bird was unable to get rid of. The contents of crop weighed 20 oz., and the cavity held 50 oz. of fluid. The bird was very thin, but in other respects all the organs of the body were in a normal condition. The muscular parietes of the crop were much thickened. Dr Crisp said that the contents of the crop might have been readily removed by incision during life; some years since he saw a number of hens that were poisoned by arsenic; one only was alive in consequence of the distension of the crop from barley, but she was unable to stand; he made a large incision; removed the contents; washed out the crop; sewed up the wound. The bird ate directly, and quickly recovered.

3. The tuberculated spleens of two pigs. The tubercles varied in size from that of a hazel nut to that of a walnut. The lungs and liver were also diseased, but the animals notwithstanding were in tolerable condition, and were killed for good. The tubercular matter formed the greater part of the bulk of the spleen. The person who slaughtered the pigs, and who had killed many hundred pigs during eighteen years, had only met with three similar instances.

4. Fungoid disease from the orbit of a sheep, which weighed about 2 oz., and projected two inches from the orbit. It had much the appearance of the same lesion in the human subject. The disease was of rapid growth, and commenced four months before the animal was killed.

5. A large oblong scrofulous bronchial gland of an ox, situated at the bifurcation of the trachea. It weighed about 17 oz., and so pressed upon the air tube as to occasion approaching suffocation. This was always relieved by introducing a hollow probang into the stomach, and evacuating the gas.

6. A large cyst (*echinococcus*) from the abdomen of (œhans wart hog *P. æliani*.) The cyst held five pints of fluid, and was in a state of chalky degeneration. Also, three small *echinococci* from the peritoneal coat of the stomach of the Java masked hog (*sus pliciceps*.) Dr Crisp said that he had found these parasitis in all the foreign hogs that he had examined, including the other species of wart hog *P. æthiopicus*, the red hog (*P. penicillatus*) and the African and European wild hogs.

7 and 8. Pericarditis in a young emu; the pericardium being covered with recently formed lymph. The liver of a Stanley crane (*A. paradisea*), in which the hard semicartilaginous tubercles formed nineteen twentieths of the bulk of the organ. Dr Crisp believes that one form of tubercle in some quadrupeds, and in many birds, was of parasitic origin.



## REVIEWS.

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*Handbuch der Giftlehre.* Von A. W. M. VAN HASSELT, Braunschweig, 1862.

*Handbook on the Study of Poisons.* By A. W. M. VAN HASSELT, Translated from the Dutch by Dr J. B. Henkel. Brunswick, 1862. In 2 Parts.

*Report from the Select Committee of the House of Lords on Injury from Noxious Vapours.* Ordered by the House of Commons to be Printed, 1st August, 1862.

ON opening the first volume of Van Hasselt's remarkable work, we found, facing the preface, the following apposite quotation from Hippolyte Clocquet:—"L'art des poisons fait partie essentielle de la médecine; elle doit être étudiée par les hommes de l'art conservateur avec un soin tout particulier." None but the most careful and prolonged study could have enabled the learned author of this work on poisons to have produced a treatise representing, as it does, the science of toxicology in all its branches, so completely, and yet so concisely. We do not hesitate to place Van Hasselt's work at the head of the long list of books published on poisons. The science is making rapid strides, from day to day. British observers are contributing more than their mite to this end. The investigations of cases of strychnine poisoning—the fact relating to poisoning by other alkaloids, as well as by metallic irritants, such as tartar emetic and arsenic—indicate to those who merely glance at the surface of scientific progress, that during the last decennium toxicologists have rendered great services to the healing art, as well as to jurisprudence. It is to be regretted that, notwithstanding the wholesale destruction of animals of all kinds in experimenting on poisons, the veterinary profession should not have gleaned the mass of useful facts published, and arrived at some conclusion as to the nature of many vegetable poisons which undoubtedly give rise to enzootic disorders. Of late years, various attempts have been made in this direction. Professor Weiss of Stuttgart drew up a short report as to the effects of poisonous plants on animals; then Professor Gamgee entered much more fully on the subject of veterinary toxicology in the *Veterinarian's Vade Mecum*; and in the past year, Professor Gerlach of Hanover has collected a mass of information on the subject, in his *Handbook of Forensic Veterinary Medicine*. In the excellent works on *Materia Medica*, by Hertwig of Berlin, and by Tabourin of Lyons, the poisonous effects of drugs are considered at considerable length, and, as the number of observers and authors increases, we may expect much more; but what is evidently required in veterinary medicine is, the investigation of diseases in districts, on certain farms, fields, &c., where vegetable poisons grow, or mineral poisons are acci-



dentally deposited. The cattle and deer of our highlands suffer annually at spring-time from paralysis of the hind-quarters, and many die. Sheep are destroyed in other parts by vegetable irritants, that induce incurable diarrhoea, and various blood-diseases occur in many counties in the United Kingdom from the tonic effects of certain grasses. It has been ascertained, of late years, that the domestic animals suffer more frequently from the effects of ergot in this country than has been generally supposed; and our artificial manures are modifying the character, if not completely changing the nature, of enzootic disorders. It may, then, with great justice, be said, that the veterinarian, as a student of the art of preventing disease, should turn his attention to toxicology far more than he has hitherto believed it necessary.

It is a great point gained in science, when the indefatigable gleaner is found to collect all the available knowledge and put it into shape. A mass of scattered facts acquire form and interest under such circumstances, and attract the attention of those who are inclined to pass over very important cases which, occurring singly and rarely, are little heeded. Such a gleaner has moulded the snowball, which is rapidly to roll itself into a mountain of material that cannot escape observation. Hasselt is undoubtedly one of these most careful gleaners. His work is divided into General and Special Toxicology.

In the General Toxicology, much valuable information is given on the actions of poisons, the symptoms they induce, the methods of investigating and treating cases. On the subject of experiments on the lower animals, the author says that their worth is much impaired for the purposes of human toxicologists, owing to the following circumstances:—

Firstly, The impossibility of a certain comparison, especially in cases in which the poison has been introduced into the circulation by direct injection, or in others in which it is kept in the stomach by ligature of the œsophagus.

Secondly, The difference in the manifestation of symptoms; animals do not fear death, or evince sympathies, &c., which naturally affect the character of symptoms of poisoning in man.

Thirdly, The different organization of the stomach and of the intestines, such as the remarkable thickness of the coats of the stomach in birds, their thinness in rabbits, and, as to function, the very powerful gastric juice of the dog, &c. Probably, these circumstances lead to the variety in the poisonous doses of substances in man and animals.

Fourthly, The lesser or greater frequency of the circulation in different animals, and the differences as to the quantity of blood in man and animals, lead to differences in the absorption, distribution, and fatal effects of agents.

Fifthly, The insusceptibility of certain animals to the action of certain poisons. Thus the herbivora are less affected by narcotic substances than carnivora or human beings. Cattle can partake of



considerable quantities of conium, euphorbium, pulsatilla; and antimonial preparations are harmless for the goat and other ruminants. Horses can partake of considerable doses of arsenic, mercurial preparations, and aconite. Pigs are not readily affected by hyosciamus and cyclamen. Rabbits support large doses of opium, morphia, and belladonna. Various water-fowls readily eat *cicuta vivosa*, and hens considerable quantities of *digitalis* without injurious effects. Parrots are endowed with a singular immunity from the effects of phosphorus, &c.

Sixthly, The existence of substances which are harmless, even when taken in considerable quantities by men, and yet are poisons for the lower animals—alcohol, aloes, turpentine (which is so deadly in the dog), pepper (injurious to pigs), *lonicera caprifolium* for goats, &c. &c.

These circumstances, without doubt, diminish the worth of experiments in the lower animals. They are nevertheless very useful in determining many points.

We are rather surprised that neither Hasselt nor his translator Henkel, have noticed Trousseau's remarkable observations as to the effects of ligature of the œsophagus, and which are so serious in their nature, as to invalidate all the results arrived at by Orfila and others from experiments on poisons, thus retained in the stomach of dogs, &c. Trousseau has shown that ligature of the œsophagus is invariably fatal if not relieved within twenty-eight hours.

In the first volume there is an ample description of the plants that are poisonous, of the effects of alcohols, and of vegetable acids. The second volume is devoted to animal and mineral poisons. The latter are divided into alkalies and earths, salts, metalloidal substances, metals and gases.

At page 137 of the second volume is a chapter on the sausage poison or *venenum botulinum*. This poison is developed in various meats, but especially in sausages made of blood and liver, and in certain parts of Europe, such as the south-west of Germany, and more particularly in Würtemberg and in the Grand Duchy of Baden, where the poor and the agricultural classes suffer most in spring, and principally in April. This poison has been known since 1793, and it is characterised by great virulence, destroying from 30 to 50 per cent. of the people who partake of it. Of 234 cases which occurred in Würtemberg, from 1793 to 1827, 110 proved fatal. Out of 400, from 1827 to 1853, 150 deaths are recorded. The peculiar nature of this poison is still unknown. The opinions of observers are principally in favour of the effects being due to a deleterious fatty acid, the *acidum sebacicum*. The name *acidum botulinicum* has been applied to the acrid material which may be obtained in solution in hot alcohol or ether, and which proves to be possessed of very corrosive properties. The sausage poison does not affect dogs and cats. In man it induces symptoms of severe nervous derangement, checked secretion, it arrests the functions of the organs of vegetative, life, &c.



The form of paralysis has been compared to that witnessed in belladonna poisoning. The deleterious effects manifest themselves from 12 and 24 hours after the sausage has been eaten.

Van Hasselt has devoted his attention to poisons in milk, and classifies them under four heads: The mineral poisons, such as arsenic, mercury, and lead, which cows and other animals receive accidentally or in the shape of medicines. The vegetable poisons, the herbivora gather in the pastures; the animal poisons, as in anthrax, epizootic aphtha, the milk disease, &c.; and, lastly, the poison of milk in a state of decomposition.

Much is said on the subject of noxious gases, but here we would refer to the observations published in the interesting report which we have selected for notice with Van Hasselt's work.

Poisons disseminated through the atmosphere from factories are committing a large amount of destruction over the country, and it appears from the Report of the Select Committee appointed to inquire into the matter, that "amongst the most deleterious vapours," according to Professor Playfair, "are those produced by the manufacture of soda, which evolves muriatic acid gas, a noxious vapour; the manufacture of ammonia salts, when conducted in a particular way, which evolves sulphuretted hydrogen, also a noxious vapour; and the smelting of copper and lead, which evolves sulphurous acid. All these vapours the Professor considers to be injurious both to vegetation and to animal life. The majority of witnesses, however, appear to consider that their injurious effects are confined to vegetable life; and only indirectly affect animals by poisoning the grass on which they feed. Their destructive effects, however, on vegetation, are indisputable."

Mr William Longton, residing at Bain Hill, near St Helens, stated, as agent to Mr Hughes of Shirley, that 200 acres of land, formerly let to cattle dealers, had been destroyed by factories. The grass growing on them had no fattening qualities, and it "affected the sheep in some way or other so as to make them throw their lambs."

Mr Peter Ford, a farmer, occupying Parr Hall Farm, about a mile off St Helens, had his hedges destroyed by the emanations from the factories, and these had a very great effect upon the grass. He said,—"I have had many cows cast their calves, and I attribute that to the poisonous matters they eat; they are always coughing; sometimes the shed will be full of vapour, and you will hear every one of them coughing; I have had as many as 16 a-year cast their calves, for two and three years together."

He was further asked,—“Have you heard the same complaint made by your neighbours?

“Yes; a brother-in-law of mine had as many as 25 a-year cast their calves; some perhaps would cast them twice over in one year.

“How many cows did your brother-in-law keep?

“Perhaps 29.

“How many do you keep?



"I now keep seven; I formerly kept 18.

"15 or 16 of them cast their calves in one year?

"Yes; I gave over cow-keeping. If I had kept stock upon that farm as I ought to have done, it would have taken all the farm to have kept them; we did not get more grass off about four statute acres than we ought to get off two; all the good quality of the grass gets killed. I cannot grow any of the best class of potatoes, flukes; I did grow one year four statute acres, and they were all killed in the second week of August by copper vapour."

Mr W. H. Michael, of Swansea, was examined as follows:—"If arsenious acid falls upon grass it makes it poisonous to the animals that eat it, does it not?

"Yes.

"Have you ever known instances of animals dying from that cause?

"Yes, a great many; my experience is peculiar in that respect, to a great extent, because this farm which I speak of is the only case I know where of late years works have been established in a part of the country where animals were grazing, because farmers have been careful to take their flocks away from the influence of these works.

"Will you state any instances you have known of animals being poisoned?

"I have known rabbits poisoned and sheep to have died, and especially two or three horses I know to have died. I have seen a great amount of injury done to ponies. The gentleman who occupied the farm of which I am speaking, kept several hundred ponies, which he bought very young generally, and fattened them for sale; he was obliged to give up keeping them, owing to the peculiarly shaggy and starved appearance those animals acquired; the knee joints began to swell; they began to get lame and hide-bound; the hair fell off, the teeth became black and fell out, and necrosis of the bone occurred, and the result was that he gave up grazing on a large tract of land.

"Were those the symptoms which would have resulted from giving those animals arsenic?

"To a great extent they were, but I do not know that any experiments have been carried over a sufficient length of time to justify us in saying that the administration of arsenic would produce precisely the same results, but they were certainly an analogous train of symptoms to those which would result from giving the animals arsenic or other similar metallic poisons.

"You have not the least doubt that those symptoms were owing to the arsenious deposits?

"Not the least doubt, because arsenic has been found in the bodies of those animals. Mr Herapath and other chemists have detected copper and arsenic in the bodies of those animals which have grazed in the vicinity of copper works."

Mr R. C. Foster, who has the management of estates in the immediate neighbourhood of the alkali works between Newcastle and



South Shields, stated, that animals were injured by food affected by the works, and to such an extent that the hay grown around the factories had to be sold for packing, and sound hay bought for horses.

Dr Lyon Playfair referred to the sulphurous acid and sulphuric acid vapour near such works. He said, this vapour is highly injurious to vegetation, and also affects animal life. The cattle fed upon the grass in the neighbourhood of these works get a thickening of their joints, and must be frequently removed to new pastures to keep them in tolerable health.

Mr Thomas Slatter, who has the management of property in the neighbourhood of Manchester and Bury, said, that the occupier of a certain land "complains not only that his crops are injured, to a very large extent, but he has had disease twice amongst his cattle; several have died, and that has always occurred when the wind was in such a direction as to carry the fumes directly over the surface of the ground." The nature of the disease was not described, but it was said that the cows gave no milk.

Referring to emanations from coke furnaces, Mr John Parrington said, that they led to the complete destruction of vegetation, and were injurious to animal life at a great distance, viz., about two miles off. They are more injurious to cattle, but not to sheep, bringing on diarrhoea and irritation of the bowels generally; their coats stare, and they look out of health. Sheep seem to remain in perfect health under the very strongest influence of smoke, but the wool is very much injured. "People farming sheep near the coke ovens have to suffer a loss from 1d. to 2d. a pound in the price of the wool."

The morsels of information thus gleaned from a recently published Blue Book, show that animals suffer to a considerable extent from noxious vapours. The ideas entertained on the subject are far too vague, and there is evidently scope for a special inquiry into the character of the disease induced by various finely subdivided poisonous principles, whether introduced with air in the system, in the act of respiration, or taken in as deposited on grass, hay, and other food.

Van Hasselt treats of these matters in relation to human beings, but we find one of his observations conclusively confirmed by the Government Report, viz., that the effects of poisons are widely different in animals and men.

Mr Parrington said, "As to the unwholesomeness of the manufacture of coke, I may mention there are some very curious facts about it, because, as I said before, it is very injurious to horned cattle, though you do not see sheep suffer, except in the wool. I think it is not injurious to people employed in the manufacture, and I think we live in a very healthy neighbourhood. I was a stranger to the neighbourhood when I went there ten years ago, and neither I nor my family have suffered from it at all. I met with a man on the road, and I began to talk to him, and I asked him what he was. He said he was a coke burner. I said, 'You look well to be a coke burner; how long have you been there?' he said, 'I have been at it ten years.'



I said, 'That is a long time for a man to burn coke.' He said, 'I was a joiner in Sunderland, and I was very much out of health, and it was supposed by the doctors that I was going into a consumption, and they told me it was no use giving me medicine. I said I thought I would try coke-burning, and see whether that would kill me or not;' and he said, 'I have never been out of health since then.'"

It is evident that the difference in the effect of poisons on different animals, depends not a little on constitutional predisposition. The whole subject is, however, one which certainly deserves to be worked at earnestly, especially in relation to investigations as to the nature of diseases of cattle and sheep, which occur in special counties or districts.



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### THE SALE OF DISEASED ANIMALS AS HUMAN FOOD.

IF any decided steps are taken for the prevention of epizootic disorders, and the suppression of the traffic in diseased meat, it is undoubtedly a fact that they will be mainly due to the cordial support tendered us by the medical profession, and especially by medical journalists. Ready as we are to acknowledge such aid and encouragement in the hitherto thankless task, we retain the right of breaking a lance with our friends when occasion requires, and this cannot be called anything but a "manly and common-sense method" of treating scientific matters.

The greatest difficulty we have had to contend with has been to convince those who have been informed as to the mass of diseased meat that has been sold, that such food is really poisonous. That difficulty has entirely arisen from inattention paid to the subject; and the more it is probed the more does it clearly transpire that the health of the people is seriously affected by the consumption of unwholesome food. It is since the early days of our labours in connection with this question that any light has been thrown on the parasites which human beings derive from the lower animals. It is but recently that it has been clearly pointed out, that anthrax is far from unknown in the United Kingdom, and malignant pustule ranks amongst the diseases of man in Britain. The observations made in 1841 by British veterinarians as to the unwholesome character of the milk of epizootic aphtha had been quite forgotten. We have insisted on the poisonous properties of such milk; and our suggestions as to its effects on the infant population were first looked upon by the editor of the *Medical Times and Gazette* as far fetched. It must soon be patent to all, that we have not gone "rather too far," and it does seem very probable that it is not the newly-drawn milk alone, but even milk after having been boiled and made up into puddings, that does injure. In the last volume of this Journal (p. 619), we published an observation by M. Guilmot, to the effect that pigs had contracted epizootic aphtha from



taking "boiled milk." We confess to have been sceptical on this point, and were somewhat astonished to receive a valuable confirmation of this extraordinary fact. On a farm near Edinburgh a cow was suffering severely from epizootic aphtha. The dairy-maid took the milk of this animal into the kitchen, and a custard pudding was made with it. Every person that partook of the pudding suffered from colic and diarrhoea precisely like the children referred to by Mr Watson in our impression for August last. Two new cases are reported this month amongst our 'Original Communications.'

But if facts are accumulating faster than they ever have done before on this subject, it is owing to the inquiries that are being made and that should have been instituted without intermission during the last twenty years. We could then have recorded hundreds of cases instead of a dozen or two.

The editor of the *Medical Times* says that young people at large shops, and others in workhouses, gaols, &c., should show signs that they suffer from disease induced by the bad meat they are supplied with. They certainly do, but these cases, like all others, have been overlooked. We have questioned students in Edinburgh and have in many cases been informed that beefsteaks or other meats have induced severe colic, diarrhoea, and symptoms quite unpleasant enough to make them refuse to eat anything that they had not seen in the raw state. We have known students change their lodgings entirely from the repeated symptoms of sickness that followed after each meal, cooked for them by their landladies, and which they were confident was diseased, and this session three students were affected simultaneously, and owing to their having experienced similar unpleasant consequences last year, now live to a great extent on fish.

Dr Douglas Maclagan stated publicly last year, that in his position as analysist to the Crown for Scotland, he was very frequently asked to analyse meats and meat pies which it was suspected were poisonous, from the ill effects induced on those that had partaken of them. In no instance had he detected poison, and it was reasonable to suppose that the meat was itself unwholesome.

We know one remarkable instance that occurred recently. Two persons sat down to dine off a steak which they did not finish. Both were seized with violent colic and purging during the night. It was thought that something had disagreed with them, but the steak was not thought of until the next day, when the servant partook of the residue, and suffered likewise.



It must be admitted that there is some ground for alarm. We do not preach what we do not believe, and have excluded from our 'bills of fare' pork, unless fed on a friend's farm; we have carefully watched the quality of meat brought in, and made it a standing rule never to eat any food at all underdone. The state of our meat trade is a disgrace to any civilized country, and we still believe that it was injudicious for a medical journalist to declare that diseased meat did not hurt those who could "get enough of it." As time rolls on, it will be rendered very evident that such a conclusion was not warranted by facts.

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### CRUELTY TO HORSES.

IF, in expressing ourselves against acts of cruelty, we prefer to speak of *horses* in particular, instead of animals generally, it is because the horse is submitted, in extent and degree, to cruelties out of all proportion beyond any other species of our domestic animals.

The horse is doomed to suffer at the hand of his master, whom he, notwithstanding, serves, and will die in the ordeal rather than disobey. Cruelty to the horse, indefinite in kind, is due to two causes mainly, ignorance, and a confirmed hardened feeling, with a heart that does not feel for another.

It is clear, that to meet the evil in all its phases, different means must be adopted; we must aim to train the young by example, teach the ignorant, and point with the instrument of the law to the wilfully cruel.

An example worthy of being recorded was set the other day by the magistrates of the county police court at Canterbury, which we subjoin:—

"BURNING A HORSE.—At the County Police-court, Canterbury, on Saturday, George Oliver Groombridge was charged with an act of the greatest cruelty, at Hoath, on the 22nd December. On the day in question the defendant attached a poor, miserable, worn-out horse to a waggon heavily laden with timber, which he intended it to draw to a town some miles distant. The horse had not proceeded more than 300 yards from the defendant's premises when it came to a stand-still, the road being rather hilly. The defendant thereupon went back to his premises, obtained a large bundle of straw, and having placed it under the belly of the horse nearest to its hinder parts, he set fire to it. The flames ascended to the body of the horse, and the fire burnt fiercely whilst the defendant stood by coolly looking on. The unfortunate animal was incapable of moving from the heavy weight which was behind it, and the result was, that the



horse was burnt in a horrible manner about the most tender parts of the body. The skin of the belly cracked and blistered up, and the thighs became a mass of burning wounds. The defendant afterwards compelled the horse, assisted by a second one, to go through the day's work, and on its return home at night it was placed in the stable, and there left uncared for until the following morning, when the defendant's wife gave the wretched animal to a labouring man, with a sum of money, to get rid of it. Subsequently the horse was released from its sufferings by being slaughtered at a knacker's yard near Canterbury. Defendant was ill and did not appear personally, but stated by his brother, who appeared for him, his anxiety to have the case at once settled. It was pleaded that he was at times deranged, and not accountable for his actions. The chairman said that, but for the proof of the defendant's illness, they would have committed him to prison without a fine, but gave him a chance of escape by paying a penalty, which, with costs, would amount to L.6, 13s. 6d. The fine was paid. The case naturally created great excitement in the neighbourhood."

The above sentence, whilst tempered in accordance with the offender's feelings of shame, which were such as to make him really ill, or to make illness the plea for being absent from court, was none the less, in our opinion, sufficient for the ends of justice—the loss of his horse, the fine, exposure, and consequent remorse, are sufficient for the individual, and we believe also for an example.

Our experience teaches, that ignorance is by far the most common, though a negative, cause of cruelty to horses; the men who torture knowingly and with intent are, we hope, comparatively few.

When one compares unenlightened man with the most docile of the lower animals, and considers that they are the work of the same Omnipotent Maker, we are almost inclined to think that the one is not so much the superior over the other as we are bound to believe.

It may not be out of place to draw a few illustrations to show how ignorance is the parent of cruelty in the management of horses. Firstly, In our estimation the quality, health, and condition of the team, go far to show the sound judgment and general character of a farmer. And such is certainly the case with men whose prosperity depends even more exclusively on the working power of horses.

If horses are overworked, badly fed, are kept in stables where they have not pure air to breathe, or are exposed to the rigors of the weather, they not only look bad, and are capable only of rendering less work than when in full tone, but a high average mortality is sure to result as a consequence.

Lameness, too, is a most common effect of ignorance, though it is the most common symptom of perpetual pain, and is unavoidably a cause of disabling from work, and also of inducing premature death.



If a horse is required to exert more power than he is endowed with, he will make the trial, but instinct admonishes him that he cannot perform the task, and he refuses to try again, the poor animal has impelled his whole sensitive body with all his power against an immoveable weight. An ignorant man whips the poor dumb creature, and, as in the case related above, even tortures with fire, but no additional power is imparted to the horse by such acts.

It is deplorable to reflect, that those who are bred and early accustomed amongst animals, unless tempered by social humane influences, are apt to be found the most unfeeling to animals.

An enlightened superintendence may do much to diminish cruelty to horses, and those who would benefit most directly by all such improvement would be the owners of horses themselves, whilst the moral influence will thus be made to show itself favourably on the minds of subordinate persons employed in the use and care of horses.

It should be held as a maxim, that to require a horse to do that which he has not the power to accomplish, and then to ill-treat him for failing, or, in obeying *instinct*, refusing, is cruelty. Examples of ill-usage of horses from the above causes are numerous, as in the case we reprint an account of, the animal was required to draw a load he could not move. A horse is required to go at a speed and to endure the pace for a time beyond his strength, or he is required to leap a height without having been trained to give the power and confidence necessary for the performance.

We hope to see the subject more and more exposed, so that the cloak of ignorance may not hide from public scorn the abusers of the generous and noble horse.

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#### WHAT AMOUNT OF GOOD OR EVIL HAS RESULTED FROM RAREY'S PLAN OF HORSE-TAMING OR HORSE-BREAKING?

TIME enough has elapsed now, we believe, to render some inquiry, such as the above questions may elicit, necessary.

Four or five years ago J. S. Rarey was heard of, wherever an English newspaper was read, as the originator of a new and more humane method of bringing young or wild horses under discipline than had been in vogue, and also for subduing and reclaiming confirmed vicious animals.



In fairness, we are willing to affirm that much more time than has yet been given is commonly required to popularise even the most valuable of new infringements on old customs ; the difficulty is generally found in obtaining an impartial and full hearing ; so little prone to radical changes are the British people until requirements for change can be shown.

Rarey's method, however, instead of meeting with hindrances such as above alluded to, was proclaimed and extolled in a way that nothing recorded within our memory ever equalled it, under the plea of humanity to the horse, set forth by the actor. The highest personage in the realm, so persuaded, graciously countenanced the performances. Royalty, nobility, and station all gave audience and aid. The highest men in military rank, and the first judges of horses amongst civilians, alike lent their patronage to Rarey's performances. Opportunities for the development of a truly good system were unexampled, hence we looked for return in kind accordingly.

Hasty, violent, and otherwise objectionable, as we know much that is commonly done in the process of colt-breaking to be, we were inclined to give time for a fair trial of all that Rarey had to say and to demonstrate on the matter, in preference to prematurely asserting our opinion, which might in any way bias that of our readers, until such evidence as time alone would reveal was forthcoming.

Of the several horses which were submitted for exhibition by Rarey at Edinburgh, which came within our knowledge, they all told either positively against the experiment, or were, as regards any deductions that could be drawn, negative trials. On the whole, from all that came to our knowledge, it was clear that Rarey was not laying the basis of any new doctrine on the art of submitting young horses to discipline, or of reclaiming confirmed vicious animals.

The feats which were shown on Cruiser, the zebra, and some other animals, such as instinctively felt that they could defy their keepers, and in some degree were their masters, these were all referable to the man, and not to his measures. The influence of the human mind over matter is so plainly demonstrated in the management of animals, that we every day have proofs of it, as clearly demonstrative as those feats shown by Rarey, who, no doubt, like the lion-tamer, was a man of the requisite nerve, and also a great actor.



Though the act of strapping up a horse's fore-leg was an old custom, and often, like the twitch on his nose, was much too often resorted to in order to subdue horses; and though the strap was also adopted by circus performers in the process of training their horses to lie down,—still, if Rarey had shown that more general recourse to the custom could be had with good effect, and that it was a harmless practice, then to him would have been due the merit of generalising into a system an incidental procedure little understood before.

At the time Rarey was performing, and when the wealthy tendered their guineas, by tens, as freely as if, and in fact believing that, it was for a most benevolent purpose, it will be remembered that some gentlemen who had witnessed the course denounced it as cruel torture. The time for looking calmly into the whole question was not then, the actor had obtained such hold, and large subscriptions were got up to induce the author to give up his secret, and nothing could be said until effect or failure was shown. The secret was so carefully kept that, until it subsided and vanished with time, all counter-reasoning only tended to fill the actor's purse.

That the minority were right we are in a better position now to affirm than when the scene was being enacted.

We have now evidence that much harm has resulted through people imitating Rarey in the art of colt-breaking. Proofs have come to our knowledge such as enable us to pronounce such means as were resorted to, to be destructive to the physical powers of horses and also injurious to their tempers.

Passing over isolated cases which go to substantiate the above position, we will adduce an instance showing several young horses in one establishment that were greatly deteriorated under Rarey's course.

About a year ago we were requested to examine some young horses, then in the hands of the gentleman who bred them. They were seven in number—viz., five geldings and two mares; six of them were five years old, and one aged six. The horses were all said to be broke quiet to ride, and, with one or two exceptions, also to drive. We observed that those young horses, which had been allowed such ample time before being put to work, showed signs of over-exertion; the condition of the fore-legs of some, and the hocks of others, led to our rejecting or putting a depreciated value on them. Since first seeing these horses we have become more acquainted



with them; and whilst at first we were disposed to lay the cause of defects on the sire, as five out of the seven were got by the same horse, the man who looked after them said, "These colts were all right enough on their legs until they were given into the breaker's charge;" on this rejoined the farm-steward, who was standing by, "Yes, sir; if you see effects, they have had their causes." "Our horse-breaker," he added, "took to Rarey's plan, strapped up the legs of the colts, and the result was the appearance of curbs and other injuries which you have seen." Then, alluding to a splendid horse, a full brother to which had been sold in a former year for the London market for £125, whilst the one before us, besides having a large curb, was timid, and very difficult to approach, and that timidity, we were assured, had all been brought on by the Rarey imitator, our elder informant added, "That animal, when first taken to the forge to be shod, stood like a lamb; but the second time he was taken there by the breaker, after his process of taming had been applied, the colt almost defied the farriers to shoe him, and from bad to worse he became so that they had to cast him from that time to shoe him."

From the above facts, and more that we have learned, we have no doubt about Rarey's method being a great trick, about which, however, more evidence will doubtless be forthcoming hereafter.

It is equally desirable that anything new and really good should be made public, and that an innovation devoid of merit, but pregnant with evil, should be exposed with the least possible delay.

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## VETERINARY JURISPRUDENCE.

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### A BUTCHER CHARGED WITH THE SALE OF DISEASED MEAT.

*(From the Western Daily Mercury.)*

AT the Liskeard Police Court, on Monday, 5th ult., PHILIP PANTER, butcher, of Landrake, was summoned to appear before the Bench for selling diseased meat at the Christmas market.—MR COAD defended.

EDWIN VIVIAN said: On the 20th of December I was at the Liskeard Market. I went into the meat market, and in going up behind the market, a butcher asked me if I wanted a piece of beef. I said, "No; I want a kidney." Some one near Panter's stall said "Here's one." I went round and saw Mr Panter, and he showed me a kidney, for which he asked 9d. I paid him and took it away. Several persons who met me said the kidney was "poor," and I took it back to Panter, who told me I ought to have known what I bought, and he refused to take it back. I hung it on the stall and left it.

Cross-examined by Mr COAD: I took no notice of the bullock. I never heard that it was a prize bullock shown at Menheniot and Callington. I showed the



kidney to Mr Hitchens, who said he should think it was good. Mr Dawe said he did not like the look of it. I live at St. Clear, and sometimes deal with Mr Cock and his brother. It was to them I showed it first, and they said it was "poor." I also showed it to Mr Davey and Mr Lamb. I showed it to Mr Lamb after taking it home and keeping it hung up all Sunday. I was not in an angry mood when I returned to Mr Panter with the kidney.

JONATHAN COCK said: I remember the evening of the 20th December last. I saw Vivian with a kidney. I should say it was poor, and unfit to be eaten. I had never seen it before. It was brought to me in the evening about eight o'clock.

By the BENCH: It has frequently occurred to me to find the kidney bad when the meat was good. I should say this was diseased.

By Mr COAD: It was smooth, and had not the usual appearance of an ordinary kidney. It was larger than usual. I was aware it was from Mr Littleton's ox, which was the largest in the market. I never saw a good kidney that was smooth, and I have been in the business 16 years. I saw the meat, which was loose. I did not smell anything offensive about the kidney.

THOMAS DAVEY said: I am a butcher in this town. On the 20th the complainant brought a kidney to me. I considered it in a decayed or decaying state—not healthy. I told him so. I did not then know from whose stall it came.

By Mr COAD: It was of a very light colour, smooth, soft and pulpy. The bullock was a very fine one. We often find the kidneys are not good when the meat is sound, and then we do not sell them.

By the BENCH: I should have thought it decayed at the first moment. When I found it was Mr Panter's I went to him and tried to persuade him to take it back, as I thought it a pity anything should be said about it.

Mr GEORGE LAMB, member of the Royal College of Veterinary Surgeons, said: I saw the kidney on Monday the 22nd. It was brought to me by Vivian and Humphrey. I examined it, and found it very soft, moist, and generally flabby externally, colour light, but not more so than many healthy kidneys are. When I made a section of the kidney, I found it had been the subject of inflammatory action. The urinary tubes contained a small portion of matter. It was not of unnatural size for so large an animal.

By the BENCH: I consider the kidney was unfit for food.

By Mr COAD: A kidney would not keep as long as a piece of the ribs of a bullock. There was nothing particular to call attention to the kidney in its external appearance. I had seen the bullock at Callington, where it took second prize; but I can hardly say whether it was then a healthy animal. Fat is considered a disease, but it would not produce inflammatory action. It was in this case of a chronic nature. If it had been of recent origin the appearance would not have been that which I observed. The state of the kidney was not such as would have prevented the animal's travelling some miles a day or two before I saw the kidney.

Mr COAD, in defence, stated that the bullock had been a particularly fine animal that had taken prizes at Menheniot and Callington, and he contended that the evidence of the last witness had proved that the appearance of the kidney had not been such as would show that the defendant must necessarily have known that it was diseased. The kidney might have been quite sound when sold, and decayed when shown to Mr Lamb. He should call witnesses who would inform the Bench that they had considered it to be good; and if that were proved he thought the case must be dismissed. He proposed to call the defendant first, but the magistrates thought it better to hear the other witnesses first.

Mr HITCHENS, butcher, said he had seen the animal and it was a very fine one. Vivian brought the kidney to him and he thought it good. He had himself a kidney on Saturday just like it, and sold it for a good one. He should think the manner in which it was carried about and handled by the complainant was sufficient to spoil it; and it might have become tainted since the death of the bullock. Witness would have bought it for a good one himself.

By the CLERK: We seldom find a diseased kidney that is not saleable. In my experience of nine-and-thirty years I never had a kidney that I could not sell, except it had been kept too long.



JAMES SNELL, a butcher, living at St Germans, said he had the other half of the bullock, and sold the kidney, which appeared to him to be a good one. He cut it up and sold it to ten different people, with suet. He saw no disease in it, and had had none of it brought back. He thought a good kidney might be very smooth, but he thought the two kidneys in the same bullock would be alike.

The CLERK thought it was self-evident both kidneys could not be diseased, because in that case the bullock could not have gone on in apparent health.

JOHN DAW, clerk of the market, said Vivian brought the kidney to him on the evening of the 20th, and told him he thought it was not good. He went with the complainant to the stall, and asked Panter to take it back if it was bad. It smelt wholesome, and appeared to be good; and Panter said he should not take it back, on that account. Mr Humphreys came and saw it, and said he thought the fat it came out of was good. Witness advised the complainant to say nothing more about it; and offered to buy the kidney of him. The complainant went about the market with the kidney from half-past seven to ten o'clock; and many persons saw it and said it was good during that time.

The complainant denied all this, but a man named Wm. May was called and confirmed Daw's answer. The complainant said he remembered nothing of it.

Police-constable Humphreys said he saw the complainant, and went with him about the market. He generally corroborated the statement of the complainant, and said he did not himself like the appearance of the kidney. He thought the meat was very good.

In cross-examination by the complainant, the witness said he had not seen him in the market after he went with him to Mr Davey's, after leaving Mr Panter's stall the first time.

The Magistrates retired to consider the case.

Upon their return, their worships stated that they had duly considered all the evidence, and had come to the conclusion that the kidney which the defendant had exposed for sale and sold, was diseased and unfit for food; and therefore the decision of the Court was that he be fined in the mitigated penalty of 18s., and pay the costs. They hoped this conviction would be a caution to him and all the butchers in the market; for complaints had been made that meat was sometimes brought there which smelt most offensively, and if any such case should be proved before the Bench, the fullest possible penalty would be inflicted.

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## PERISCOPE.

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### THE HEALTH OF FARM STOCK.

*(From the Scottish Farmer.)*

REPORTS are far from satisfactory as to the health of cattle in Scotland, and especially in the Lothians, Fife, and other grazing or feeding districts. Our predictions as to the consequences of purchasing stock at the recent All-Hallow Fair have been quite verified. It is immediately after the purchase of stock that the foot-and-mouth disease appears, and from four to six weeks later when the lung disease manifests itself. In several instances that have come to our knowledge of late, the cattle purchased at All-Hallow Fair have turned out quite as badly as we anticipated, and have, as usual, communicated disease in districts that had been exempt for some time. As they travelled from Edinburgh they disseminated the murrain, and within the last month have caused a very considerable outbreak of pleuro-pneumonia in many parts to which they have been taken.

The first case we shall allude to refers to the spread of disease by travelling animals on the road. A lot of lean cattle driven through Fife were turned into a farmyard, and the drovers solicited a night's shelter. The farmer, fearing disease, ordered men and animals off his farm at once, but the cattle had got at a heap of turnips and slavered them over, as sick cattle usually do. Owing to



want of caution, the turnips were thrown before the home stock on the farm, and the whole took the foot-and-mouth disease.

A second instance refers to the communication of disease through the cattle trucks. In stocking a farm, the farmer procured a fine lot of home-bred cattle from his father. They were placed in cattle trucks, every attention paid to their comfort, and taken on the new farm. Six weeks after, pleuro-pneumonia broke out amongst them. They are in a district otherwise healthy, and came from a perfectly healthy locality. The trucks they were transferred in had been extensively used during the All-Hallow Fair week, and up to the time of the conveyance of the lot now showing signs of disease.

A third case refers to the outbreak of pleuro-pneumonia in purchased stock. A lot of fine cattle were sent to a farm on which the turnips are let annually. They were purchased at All-Hallow Fair, and have been dropping off one by one during the month of December.

Another case belongs to that class of transactions which call for legislative interference. A farmer purchased a lot of cattle in moderate condition. They were sold in a lot to a butcher, who was to take them as fast as they were fit. The first two sent to the butcher proved to have diseased lungs, and the honest tradesman refused to have anything more to do with the lot. They were sent to Edinburgh half-fat and sold to a number of farmers. The loss on the first purchase amounted to several pounds a-head, which we heard it was the farmer's intention to claim from the butcher.

Thus is the country steeped with disease; and thus are the farmers losers to hundreds of thousands annually; and when they suffer, instead of attempting means to check the losses, they adopt means which injure their neighbours and must react on themselves.

It is much to be regretted that the experience of twenty years should have resulted in a state of affairs so wretched and demoralising. It is very unfortunate that, instead of the question of preventing disease in stock being freely discussed by farmers, it is never alluded to. Every one has his secrets to keep to himself; and if asked to what extent disease is raging on his farm, or in his district, the answer is that there is none at all, or merely a trifle.

It is undoubtedly a fact that farmers have found it was not worth while sending for veterinary surgeons and medicine when the lung disease appears; and that, so far as past experience is concerned, it was always best to sell to the butcher. But, to show the effect of prevention, we may compare two cases derived from actual practice.

A farmer purchased forty-two head of cattle; they were placed on fields in the spring, and fed on grass alone; they improved as well as the state of the grass would allow them, and in a month's time had evidently accumulated some flesh, and gave indications of thriving well. One bullock was seized and sent to Edinburgh; a second was seized, and the farmer began to fear. He applied for advice at the New Veterinary College. Preventive measures were energetically adopted, and only one other case occurred the week after advice had been sought. This purchased stock was kept away from other cattle on the farm, and these were never seized. The whole steck paid well.

The second case occurred about the same time in a hilly district, very rarely visited by pleuro-pneumonia, and only when market cattle have been taken into it. A stock of twenty-eight animals was bought and placed on good pasture. Pleuro-pneumonia broke out, and seized twenty-one animals, which were slaughtered one by one; the remaining seven were then sold. The disease was committing these ravages during the whole summer, and the loss to the farmer amounted to upwards of L.300.

The first farmer lost about L.10 on the three sold diseased, and paid L.12 for the adoption of preventive measures—a contrast which is equally striking in other cases that we might adduce, and shall revert to at another time. It is quite evident that prevention is better than cure, and far better for the farming community than the sale of diseased stock.



## THE FOOT-AND-MOUTH DISEASE.

(From the *Scottish Farmer*, Jan. 21, 1863.)

WE have recently had but too many opportunities of witnessing fatal forms of this disease, and also forms that, if not fatal, have rendered cows useless as milkers, and sheep worthless, because unable to move, and sometimes unable to rise. We have previously estimated the losses by this disease as not above 1 per cent. Amongst dairy stocks the malady has, however, been quite as troublesome, and has led to as much or more loss than pleuro-pneumonia; because, confident of the recovery of the affected animals, stockowners have not passed them into the hands of the men who go in their trade by the name of "tink butchers." We know not the derivation of this unenviable title, and its etymology is as void of substantial grounds as the origin of the name "goat" applied to the diseased cows slaughtered by hundreds in the Edinburgh Slaughter-houses for the special benefit of the Edinburgh citizens. The cattle that die of the foot-and-mouth disease are not "goats," for they have not diseased lungs. We may notice some of the more frequent complications above alluded to.

Garget or inflammation of the udder and milk abscesses occur under a variety of circumstances. In severe cases of the foot-and-mouth disease, there is much congestion of the mammæ, the secretion of milk is stopped, and all the symptoms of inflammation soon appear. In other cases, the eruption induces pain in the teat, especially when the animal is being milked; the udder cannot, therefore, be stripped, and the milk curdles within it. The milk ducts become blocked up, and the solidified milk acts as a foreign substance, inducing inflammation, hardening of the udder, and destructive suppuration. These different cases require very different treatment. In the first form, the udder must be fomented frequently with warm water, gently hand-rubbed at intervals; and as the inflammation subsides, a stimulating embrocation must be used. A dose of purgative medicine should be given to the cow. In the second form of disease, the latter injunction also holds good, but care must be taken to draw the milk off without unduly hurting the sore teat. A tube must be passed up to draw off the milk, and we expect that it is in this class of cases that great benefit will be experienced from the use of the milking machine, so as to avoid the squeezing and rubbing of the inflamed spots and removal of scabs. The udder should be often hand-rubbed, and compound iodine ointment applied daily. It is essential to keep the cows on low diet, so as to diminish as much as possible the milk secretion.

When abscesses form, they require to be opened, but much mischief results from cutting into the mammæ unless suppuration has really taken place. Not unfrequently the abscesses point to the milk reservoirs in the gland, and the matter is discharged in the act of milking.

The foot-and-mouth disease not unfrequently leads to affections of the alimentary canal, of the feet, of the joints, and of the blood.

In a case which occurred recently, the animal—a dairy cow—had a very severe eruption of the mouth with intense fever. Not only could solid food not be grasped with the lips, but water could not be swallowed. The symptoms of general fever increased in severity, diarrhoea occurred, and the animal died on the fourth day. After death, the eruption was found to have extended down the gullet and into the stomach—a result occurring more frequently in calves and young pigs than in adult animals.

It is often pitiable to see the affected animals unable to stand, especially on their hind feet. If kept dirty as they usually are, the inflammation around the upper part of the feet is intense. Suppuration and fistulæ result, the pus burrows, and the hoofs drop off. We have not unfrequently seen a new hoof form and push the old one forwards, so that an animal had apparently very long feet, could not stand, and all because it has four hind hoofs instead of two—the old ones so wedged in the newly formed ones as only to be dislodged with difficulty by means of the knife.

Far more serious are the cases in which the fetlock or foot-joints become in-



flamed—they suppurate, and the animal experiences intense pain, and inability to stand or move on the affected limb. The appetite is disturbed, secretion of milk stopped, emaciation increasing daily, the ribs are well seen through the tight skin, the back arched, pulse frequent, expression of countenance indicative of pain, and some swellings occur in different parts of the body, which prove that the blood is poisoned. Cows in this state in our town dairies are being daily left to starve, and, when their case appears hopeless, are sent to the pig-feeder or dead meat market. Treatment consists in cleanliness at first, fomentations, and, if the inflammation of the joint sets in, repeated blistering. Low diet and a dose of physic are also to be enjoined in such cases.

## DESTRUCTIVE DISEASE IN SHEEP IN IRELAND.

*(From the Dublin Evening Post.)*

FROM several correspondents we learn that a very destructive epidemic now prevails amongst sheep in different parts of Ireland. By some it is designated a disease in the liver, which soon proves fatal. By others it is described as a species of foot-rot; but in any case, the malady has already caused serious losses amongst the flocks where it has broken out. We have heard of two instances in Meath where the mortality was considerable. In one of these cases, the owner—a gentleman known as an extensive grazier in that county—informed us this day that he has lost within a few days two hundred sheep. We have also heard of the disease in some parts of the south; but, as our information is not of a positive character, we shall not further refer to it. In some parts of the west the epidemic is said to have been very fatal; and we have been told of one extensive grazier in the county of Galway who has lost a thousand sheep, but this is probably an exaggeration. Sufficient, however, is known for certain to cause the owners of sheep to take all possible steps for the arrest of this destructive disease.

## ARSENICAL POISONING IN ANIMALS.

*(From the Scottish Farmer.)*

A RECENT Blue-Book refers to the important question of noxious emanations from factories, mines, &c., and indicates the danger to animal and human life from the poisonous principles with which the atmosphere of districts is occasionally charged. Some interesting facts on this subject have been published of late in Germany. The Professors of the Dresden Veterinary School have been investigating diseases in Saxony arising from such causes. Many chemical manufactories exist in that country, owing to the abundance of minerals to be found in its mountains. From these factories agents are driven off which pollute the air and destroy animals that are living or working in their vicinity. These effects have been attributed to preparations of lead, to acid vapours, and occasionally to arsenic. It has been found, however, that symptoms arise from the gradual introduction of the latter poison into the system which have hitherto not been attributed to it.

Professor Haubner performed an experiment on the point, and gave a sheep daily from 3 to  $7\frac{1}{2}$  grains of arsenic. The small dose was commenced with, and it was gradually increased to the larger one. At first the effect appeared salutary, and, indeed, that of a tonic; but there soon appeared dullness, loss of appetite, and even little water was consumed. At this time, a painful spot was observed at the anterior part of the belly. The skin was of a blue colour, the wool dropped off, and the animal experienced great pain on pressing the gastric region. In fifteen days a swelling occurred where previously the above symptoms were noticed. The swelling increased, the animal was very costive, and refused all food. By the seventh week there appeared a hollow beneath the skin in the centre of the swelling; and by the tenth week an abscess formed here, which



opened and led to the development of a fistula, communicating with the true stomach. This passage into the stomach was indirect, and it was only after the lapse of three months that the opening was large enough to permit the exit of food.

This experiment was performed with a view to determine the nature of a disease which occurred frequently in the neighbourhood of a village, and close to some arsenical mines. The malady attacked the cows, which were seized with dysentery and tumours in the belly, terminating in fistulous openings of the stomach such as those above noticed. A number of *post-mortem* examinations were made on these cows, and that the disease resulted from arsenic was confirmed, especially by analyses of the tissues around the fistulæ of the flesh of the animals, and of their livers.

### DENTITION OF PIGS AT THE BIRMINGHAM SHOW.

(*From the Scottish Farmer.*)

At the great fat show at Birmingham, Professor Gamgee disqualified a pen of pigs belonging to Colonel Pennant, on the ground that the three were not all of the same litter. The Colonel, being dissatisfied with the decision—having been assured by his bailiff that the three were all of one farrowing—has since appealed to three other veterinary surgeons—Mr Barth of Chester; Mr Farrell of Dublin; and Professor Simonds of London. The first writes that there is some irregularity in the dentition, the milk or first incisors in one not being cast, but attributes it “to some previous derangement of the natural functions of the pig;” a statement which was too vague for Colonel Pennant, who writes to Mr Barth asking him to say distinctly whether there was anything in the teeth of the animals “which would prove that they are not of the same litter or of the same age.” Mr Barth, thus shut up in a corner, endeavours to escape under a little cloud of dust which he raises about the general want of uniformity in dentition, &c., &c., in the porcine race. Anxious to please the Colonel’s bailiff, but desirous at the same time not to offend the truth, Mr Barth again speaks of the dissimilar dentition in the three pigs, and finishes up his communication by the following sentence, which, we must say, looks very like “hedging;”—“I of course cannot presume to say your three pigs are of the same litter, but as I am of opinion they are the same age, and there is nothing in their external and general appearance to excite my suspicions on that point, I cannot see any grounds to object to them as they have been represented—viz., of the same age and litter.”

Mr Farrell found no difficulty whatever in arriving at the conclusion that the pigs were of the same age. In his note to Colonel Pennant he expresses his happiness in being able to “say that I can most thoroughly endorse the statement of your bailiff Mr Smith. I have made as careful an examination as I possibly could, and do not entertain the shadow of a doubt that the certificate I herewith send is correct.” The certificate about the accuracy of which Mr Farrell is so certain is as follows:—“I hereby certify that, at the request of the Hon. Colonel Pennant, I have this day examined, at Penrhyn Castle, three sow pigs with reference to their age, and am distinctly of opinion that said pigs are of the same age, and from their general appearance I would believe them to be of the same litter.”

Professor Simonds, cattle pathologist at the Royal Veterinary College, London, and the chief authority on dentition in this country, goes dead against Mr Farrell. He writes—“I hereby certify that I have this day examined three pigs, the property of the Hon. Colonel Douglas Pennant, M.P., identified as being the same animals which were exhibited at the late Cattle Show at Birmingham, and find that a variation exists in their teething which is not consistent with their being all of the same litter.”

Out of four veterinarians who examined the pigs, we have thus two, the most eminent in their profession in Great Britain, who declare that the animals were



not of the same litter. One of the other two faithfully records observations which militates against his hesitant conclusion that they are of one farrow ; while the fact that the fourth did not observe anything to cause the slightest suspicion in his mind that they were not the same throws distrust upon his own knowledge rather than discredit upon the competency of Professor Gamgee.

We have refrained thus far from saying anything about this great pig "row," which has occasioned no little talk in England, and even in Scotland ; though we have never for a moment doubted that Professor Gamgee's verdict was the right one. He did not go to Birmingham as a referee without putting his capabilities for the onerous and thankless office to the severest test at home. He visited the stocks of pig breeders in the Lothians, and under the most difficult circumstances told the ages of the various animals with an accuracy, as one of the breeders himself assured us, astonishingly minute. And pigs in England, we presume, get their teeth under the same laws that govern the growth of their "ivories" in Scotland. Besides, there was no reason in the world why Mr Gamgee should throw out any pen of pigs if they were qualified to compete. The easier course was to pass them ; and we doubt not the Professor would have been only too glad to have given his *imprimatur* to the statements of all exhibitors, had not the interests of truth and justice compelled him to do otherwise.

The matter, however, is not yet ended. The bailiff and his man are prepared to swear that the pigs were of the same litter, while Colonel Pennant states that the jaws of the pigs, which are to be slaughtered, will be kept for future reference. But whatever may be the result of further investigations, there can be now no doubt on the minds of unprejudiced persons that the verdict of Professor Gamgee was warranted by the irregular dentition of the animals. The marked difference may have been due to the effects of one of the pigs feeding on rotten sugar, which was the somewhat apocryphal story we heard the man in attendance at Birmingham tell to account for the state of its teeth ; but, for ourselves, we are rather disposed to believe that the bailiff and his man are mistaken than that the teachings of science are false.

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## THE LAMB EPIZOOTIC OF 1862 IN AMERICA.

(From the Albany Country Gentleman.)

THE spring of 1862 was distinguished by a peculiar mortality among lambs. Over how great an area this extended I am not informed. It did not prevail in Vermont. I have made no inquiries in respect to it in the States lying south and west of New York. But in all the counties of New York from which I have received any information on the subject, its ravages were more or less seriously felt.

Having had an opportunity of observing this epizootic in my own and contiguous flocks, I regret that I did not find time carefully to notice its symptoms in their various stages and combinations, to make them matters of contemporaneous record. Consequently, I must speak rather generally, and with that degree of vagueness which always attaches to the recollection of such a class of facts. If any one kept a daily record of separate cases, he would place the agricultural community under special obligations by its publication.

The lambs affected by the epizootic had the appearance of a general want of physical development at the time of their birth. Their bodies were small and lean, or if not, they had a peculiarly flaccid feeling, as if the muscles had not attained their normal consistency. The bones generally lacked the usual size. The back and neck were thin, the legs slender, the head small, and the face oftentimes singularly attenuated. When to these appearances was added the not unusual one of a coating of wool and hair much thinner and shorter than usual, the resemblance to a prematurely born animal was striking.

Some were brought forth so feeble that they never rose to suck. A portion survived for a few moments or hours ; others lingered along from two or three



days to a week. They were usually dull, made but languid efforts to feed themselves if their dams were at all shy, and many of them would scarcely follow their dams about the yards or fields. Those that survived required extra care, and very few of them attained ordinary size and plumpness, however plentiful their supply of milk.

Congenital goitre in some instances accompanied the preceding symptoms. In several flocks, a few of the lambs were born with their heads and necks so drawn down, and occasionally also twisted sideways, by the action of the muscles, that they could only suck with difficulty, and by assuming the most unusual postures. In the worst cases, the lambs starved if they did not receive assistance from the shepherd until they acquired strength to make the unusual exertions required of them. In the same or other flocks, another set of symptoms appeared. Strong healthy lambs a week or two old suddenly lost the use of their legs to a greater or less degree. Some hobbled about as if lame in every foot; others could scarcely walk. A portion grew no worse, and after a few weeks recovered. A small number became unable to stand even when placed on their feet; but they continued to look healthy, fed heartily when assisted, and, so far as my own immediate observation extended, most of them gradually recovered when the weather became settled and warm.

My impression is that none of the symptoms (or maladies) named in the last paragraph had any necessary or direct connection with the epizootic proper. The goitre is a well-defined disease generated by obscure causes, but by those certainly which do not geneaally either produce or accompany the co-existent effects which were observed in the epizootic. And, indeed, it accompanied the epizootic in but comparatively few flocks. The stiff neck and the lameness above described perhaps as often appeared in healthy flocks of lambs as in those affected by that malady. The first appeared in healthy and diseased individuals indifferently. The last, so far as I observed, confined its attacks exclusively to the healthy.<sup>1</sup>

The local visitations of the epizootic of 1862 were quite capricious. While many flocks of sheep of all grades in this (Cortland) county wholly escaped its effects much the larger number were losers by it in proportions varying from 10 to 90 per centum—or practically to 100 per centum, for the few that recovered in badly diseased flocks were of little value. The average loss in the *larger* infected flocks was, I think, about 50 per centum. My flock lost 40 per centum, my son's 70, and a neighbour's 90.

In Onondaga county, the Merino flock of Asahel F. Wilcox hardly raised a good lamb; others suffered in different proportions. But I think the epizootic was much less prevalent and fatal than in Cortland.

In Steuben County, Philip F. Myrtle's flock lost nearly all its lambs. General O. F. Marshall's (if I remember right), 40 or 50 per centum, and so on. These are sufficient specifications.

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<sup>1</sup> In regard to the causes of this stiff neck, I have no hypothesis at present which I can offer with much confidence. The lameness and loss of the use of the limbs I am disposed to consider the effects of epizootic rheumatism, equivalent to epidemic rheumatism among human subjects, which sometimes prevails extensively among children. I never witnessed the malady among lambs before 1862. But on mentioning it at a farmers' meeting at Manlius, N. Y., a few month's since, I found that it had prevailed in that region for several years. Luther Baker, an intelligent flockmaster of Lafayette, stated that it had several times appeared among his own and his brother's flocks, and had proved so destructive, that they considered it the worst enemy their lambs had to encounter. He said it generally appeared at the time the ewes were let out of their winter inclosures to grass, and that it attacked "the best lambs." He expressed no opinion as to its origin. A. H. Clapp, of Pompey, another intelligent flockmaster, stated that he had also lost lambs exhibiting the same symptoms; that he had discovered them eating dirt; that on opening their stomachs after death, he had found dirt in them. Mr Baker replied that he had frequently opened their stomachs and found no dirt in them.



Strangers to the flocks I have named<sup>^</sup> will be inclined to pause at this point and inquire whether they had previously proved themselves as good breeders, and as vigorous in constitution as the prime flocks of the country. In the case of all of them but one, I can, on my own personal knowledge, unhesitatingly reply in the affirmative. And I have been at the pains to ascertain that the rams used in those flocks in the fall of 1861 were, in nearly every instance, tried and approved animals. Some of them had previously got excellent lambs with the same flocks. Two of them were used in different flocks in the fall of 1861, and each got entirely healthy lambs in one flock.

Many speculations have arisen in respect to the origin of so destructive a malady. I have conferred with some of the most intelligent flockmasters in this State and Vermont on the subject, and the prevalent opinion among them appears to be that it was occasioned by a want of "exercise and fresh air" on the part of the dams during pregnancy. Some have assigned high condition in the dams, and their confinement to dry feed, as concomitant causes.

That our flocks of sheep in New York were unusually confined during much of the winter of 1861-2 is certain. Uncommonly deep snows fell about the first of February, and though they wasted away towards spring, their hard crusts prevented sheep from straying from the immediate vicinity of their stables. Many flocks scarcely moved fifty yards from their stables during the last ten or twelve weeks of their pregnancy. Their appetites were kept keen by the steady cold. The free consumption of food, inaction, and advancing pregnancy, increased their flesh, and these causes reacted and rendered them perfectly contented in their confinement. Many flockmasters have remarked to me that they never before saw their sheep so quiet, so disposed to remain constantly in their stables, and so fleshy towards spring. Having eaten, they lay most of the time in their bedding until they again rose to eat. Flocks accustomed to run in pastures in the winter, and to dig down to the grass, were of course entirely cut off from their usual supply of succulent food.

The above theories of the exciting causes of the epizootic are liable to objection. The snows in New York were no deeper or more continuous than in Vermont. The flocks which brought forth diseased lambs were often in no higher condition than those which brought forth healthy ones. The exclusion from grass was common to all flocks, and the fact that my own and my son's flocks, both affected by the epizootic, were fed on turnips all winter, would seem to prove that want of succulent food by the dams was not, *per se*, one of the leading causes of the disease.

But the same line of reasoning can be brought to bear equally against the longest settled and most universally received explanations of the origin of various maladies among both brutes and human beings, and especially of epidemic or epizootic maladies. Typhus fever, for example, is by common consent generated by certain atmospheric conditions. But these conditions may recur for years without producing that disease, or only occasional sporadic cases of it. At length, however, the predisposing or epidemic influence co-operates, and then the local or directly exciting causes bear their legitimate fruits, and the pestilence "walketh at noon-day." But even then all epidemics make unaccountable discriminations. Where all the superinducing conditions are apparently the same, the malady is more malignant and prevalent in one region than another; some neighbourhoods are almost depopulated, while contiguous and even intermediate ones are exempted from visitation, and in the very centre of its desolating track individuals and families continue to enjoy the most perfect health. This equally describes the action of epizootics.

I believe the causes above assigned for the epizootic of 1862 are the true ones, or at least they are the main ones. I cannot conceive of any circumstances (consistent with ordinary care and good treatment) which would seem better calculated to lead to the non-development or other abnormal condition of the fetus of a naturally restless and roving animal like the sheep than long-continued confinement and inaction during pregnancy, the habitual inhalation of impure air,



and an unusual, not to say morbid, secretion of fat. And I should consider abstinence from succulent food, non-exposure to the bracing out-door air and wind, and deprivation of sunlight, additional or accessory causes.

What farmer does not know that the constrained inactivity of any female domestic animal during a protracted period of pregnancy is prejudicial to the healthy development of her unborn progeny? Who confines the mare or cow to her stall, or the sow to her sty, for months preceding parturition? Who does not know that the evils of close confinement in such a case would be greatly heightened by an impure, and consequently unwholesome, atmosphere? And is there a farmer who has not observed that none of his domestic animals when fat produce as large fine offspring as when in medium condition? If there were no others, a *mechanical* impediment would exist to the full growth and expansion of a foetus in the womb of a very fat ewe. The pressure of the fat on the walls of the womb would not leave room for it.

I do not claim that sheep need to be exposed to severe winter storms to preserve health and functional vigour, but I believe that a sheep or any other animal which is well fed, carefully tended, and sheltered from ordinary vicissitudes of weather, acquires a "tenderness" from this hothouse line of treatment, which not only renders it more subject to casualties, and more susceptible to all mofic influences, but which actually and necessarily in all cases accompanies (or is itself the effect of) an impairment of the physical tone necessary to *perfect* functional action, such as the development of the foetus, parturition, &c. Peasants bring forth hardier offspring than princes. All females (others being equal) accustomed to moderate activity and labour, and to reasonable exposure, produce stronger and healthier progeny, and produce them with less danger to themselves, than those unaccustomed to these things. I will not enlarge on the point, because I intend to discuss the general effects of this class of causes on a future occasion.

It might be very difficult to show by tangible proof that frequent exposure to the direct rays of the sun is necessary to animal as it is to vegetable health. But all analogy goes to establish the fact; and I very much doubt whether a highly intelligent physician can be found who has adopted the opposite conclusion.

Green feed in the winter for breeding ewes is thought by many, perhaps by most, of our flockmasters, to be of no particular utility. They have generally wintered their flocks without it, and they assert that their lambs are as large and strong as if they received it. Of the last fact they obviously cannot be certain. Who can say that this deprivation of *natural* food may not be *one* of the exciting causes of that unexplained and unexplainable loss of life or inferiority among lambs, which is occasionally witnessed in the most successfully managed flocks? Is it not reasonable to suppose that the craving which sheep and other herbivorous animals show for green food in winter, is the result of an instinct which points out to them what is best for their health and the normal exercise of *all* their functions? It is not unreasonable to suppose, too, that, in depriving the pregnant ewe of succulent food, we deprive her of the means of furnishing a full supply of the best nutriment to the embryo animal. But here, too, I am trenching on a future field of examination.

But waiving the necessity of green feed, *per se*, I believe that I have seen the fact repeatedly established that it will not do to let pregnant ewes obtain green feed by roving about the fields and turnip patches for the first two or three months of pregnancy, and then confine them rigorously to a small yard and dry feed. Some farmers habitually do this, but I never saw it done with impunity in a large flock. In winters unfavourable to sheep, it often leads to a wholesale destruction of even the grown animals. And this was precisely what the elements accomplished last winter in the case of all flocks which had been previously allowed to run in the fields. After the great snow which fell near the 1st February, the fields and their verdure were totally inaccessible to them.

HENRY S. RANDALL.



## PLEURO-PNEUMONIA IN AUSTRALIA.

*(From the Melbourne Argus, Nov. 6, 1862.)*

THE following report has been made to the Chief Secretary by Mr Miscamble, on the subject of pleuro-pneumonia in cattle, the importance of inoculation to prevent the spread of the disease, and the manner in which the operation should be performed:—

## HISTORY.

From the earliest time we find that similar diseases have carried off immense numbers of useful stock, to the serious loss of the community. Some foreign states—for instance, the Venetian, in 1599,—to save the people eating tainted meat, and to preserve the few remaining stock, had to prohibit, for some time, the use of beef or veal as food.

In 1682, France was ravaged with an epizootic in cattle. In 1683, a disease broke out closely resembling the present scourge. In the commencement of 1700, 30,000 head of cattle died in a short time in the neighbourhood of Rome alone.

Its infectious and contagious nature was clearly traced and proved in England during 1745. It continued twelve years. In the third year Government took the case up, ordered all infected beasts to be destroyed, remuneration being made the owners. Eighty thousand head were so slaughtered, and the numbers that died were supposed to double this large amount. One county alone lost 40,000, another 30,000, in six months. Now, this heavy loss occurred where the cattle were perfectly quiet, and under the constant eye of the owner,—to cattle that could be handled, medicine administered, and the result watched.

In what a different position are our valuable and extensive herds? Medicine, however efficient, could not generally be administered, nor operations performed, only at a great expense and loss of time, which few would be willing to incur.

Whereas the simple preventive that I offer is easily and inexpensively performed, even on the wildest of cattle; the owner, secured from any but a trifling loss, and the number as well as character, and consequent commercial value, of the stock of the colony maintained.

That this fatal disease has been introduced into this colony by the importation of one infected beast is now admitted, and we feel the result.

Inoculation, let its value be disputed as it may, has proved a blessing to the human race. It is recommended by the first professional authorities of the day to check or eradicate the fatal disease now attacking the sheep in England. It has saved and will save the bovine race of this colony to us.

No other remedy, less expensive, so easy of application, or giving better results, has ever been recommended that I am aware of; and my now considerable personal experience of its great benefit, and perfect success wherever properly employed, confirms my decision to urgently recommend its universal and immediate enforcement.

## PREMONITORY SYMPTOMS OF PLEURO-PNEUMONIA.

*Those first perceivable.*—The animal separating from the others and seeking shelter, feeding occasionally only; the head and general appearance heavy and sluggish, careless of company, perhaps a cough, a falling-off in condition or milk, back slightly set up, a perceptible disinclination to use the chest and fore-legs with the ordinary freedom, seldom seem to enjoy the usual morning stretch. These symptoms should determine the instant removal and isolation of the animal, and immediate information should be sent to a commissioner.

## CONFIRMED SYMPTOMS.

*First.* All the above premonitory symptoms in aggravation, together with a quick and laborious breathing, giving out with every expiration a deep, painful, audible grunt; nostrils and eyes discharging matter; pulse quickened and oppressed—wiry, with intermissions; lastly, perceptible disinclination to walk, or even to stir, particularly downhill; animal standing mostly uphill, occasionally



lying down; the head depressed, with a frothy and protuberant mouth gasping for breath, and at last great distention of the stomach; and in the worst of cases diarrhoea. When the examiner is sufficiently acquainted with the anatomy of the animal, and his ear is experienced, percussion and auscultation will detect with certainty the locality, extent, nature, and probable termination of the case under examination, be it in the premonitory or the confirmed stage.

#### THE POST-MORTEM

will show in an animal dying with this complaint one or both sides of the chest occasionally filled with a fluid of a bloody tinge, loose flocks of lymph floating about, and often covering the whole of the interior and its contents. The blood within the body very dark—in some cases, almost as black as tar.

The most marked characteristics of this disease, however, are found within the lungs. These when cut in two exhibit various tints, from the palest pink to the darkest brown. The variagating colours are surprising, especially when the first cut is made into the solid parts of the lungs, which are generally much swollen. Then the colours are bright, and the lines between them marked. These lines are the air-passages, running here and there, marked with a tough mucus, giving the appearances usually called marbled—a word most expressive. The diseased portion of it is hepatized and solid as liver, and looking as if petrified. The heart, from sympathy, is usually found small and flabby.

The contents of the abdomen are healthy, except in a few instances, where the liver has suffered from the same cause as the heart.

When the animal is killed in the first stages of this complaint, it will only show to a casual observer a slightly altered appearance to that of a healthy subject. Yet there will be found in one or both sides of the chest patches of a thin exudation of yellow matter or lymph adhering to the serous membrane covering the lung or lining of the chest. The lungs will be found enlarged or swollen in one or more of their lobes, and be found generally opposite to these effusions.

This enlargement arises from gaseous and not solid matter, when the hepatized lung will be found to sink in water, and the former will float on its surface.

*Thirdly and Lastly.* There are other significant and most important post-mortem appearances, particularly in cases which have existed for months and even years, but unprofitable to enter upon here, for they can only be recognised and taken advantage of by medical judgment, formed on the experience that the commissioners and other similarly favoured persons have acquired.

#### THE CRUSH-YARD OR RUN.

A good crush-yard could be erected in any central yard sufficient to operate on all neighbouring cattle. It should be very strongly built, all of round stuff, with bell-mouth opening from any gate that cattle have been accustomed to, and running down the longest side of a fence attainable into another yard. It should be built only two feet six inches in the clear in width, height that of the yard, and capped with entrance and exit gates, the object being to prevent cattle turning.

#### THE SELECTION OF MATTER

should be taken from the lung of a slaughtered beast that has been suffering in a first or middle stage of the disease. The age of the animal is of little consequence compared to the age of the matter to be selected. It should be an effusion of short duration, but taken from a part yet in activity, however much it may be enlarged.

The hepatized portion of lung from which to drain the bovine life-preserving liquid, should be as near a salmon-colour as possible, but not darker than brick red.

A piece 6 inches by 4 inches will afford sufficient to inoculate 500 head; this should be placed in a dish, and cut in all directions, then squeezed, and the matter which exudes is fit for use. The surplus may be bottled for future use in half ounce phials, sealed and covered from the light, and kept in a dry and cool atmosphere. It will retain its virtue for at least two months. I have, however,



preferred fresh matter, particularly if obtained from one of the herd I am about operating upon.

In no instance should any portion of the lung itself be inserted, as its speedy decomposition will destroy the tail, if not the very life of the animal.

In the summer months the greatest care must be observed in carrying out these instructions.

#### SECURING THE ANIMAL FOR INOCULATION.

Quiet dairy cattle may be operated on anywhere, at pleasure, but they are best tied or bailed up by the head; very few indeed need tying by the leg, and those that do should be fixed forward instead of behind, as in milking. Calves are best secured by crowding together in a corner as many of them as will allow elbow-room to the operator.

Wild cattle need strong yarding room. One operator and assistant, with proper yards, may inoculate even 500 of bush, and nearly double that number of quiet cattle, daily. They should have some distinctive mark placed on them, which would not only enhance their commercial value, but afford data by which the Government and science may obtain valuable information. I would recommend, as a mark, a circular hole punched through the ear, or to cut the hair at the tail square.

#### INSTRUMENTS.

The instrument I recommend is almost an ordinary pocket-knife, with a straight blade at each end,  $1\frac{1}{2}$  in. long  $\frac{3}{4}$  in. broad, lancet-pointed, a groove tapering to near the point should run down the centre of each blade to hold the virus. This blade should be strong, and have a firm cutting edge, so as to be capable of much rough work. The handle should be sufficiently large to give a firm grasp without danger of causing cramp.

I would also recommend that the thumb of the left hand be guarded with a stout leather thumb poke, as it is in danger from the knife at the instant it is being used, from the generally disturbed state of the animals.

#### THE OPERATION OF INOCULATION.

Quietly and firmly secure the tail at the lower end with the left hand (should the beast be very troublesome, an assistant might steady the upper part by holding it); while, with the right hand, the instrument, being previously dipped in the matter, should be plunged at one thrust half an inch obliquely into, not through, the skin, at a point three inches above the end on the front of it; and, to ensure the success of inoculation, I, in all adult cases, reapply the virus in the incision just made by gently opening it with a flat blunt-pointed bone, or other instrument, charged with matter, closing the wound with gentle pressure by the left thumb; when I consider the animal invulnerable to contagion.

The hair, where found convenient, could be removed with scissors.

On the withdrawal of the first instrument from the wound, it will be found to have left a natural-like flap, and is easily closed with the thumb, as stated above.

The operation I recommend is so simple that any one, after slight instruction, can perform it; while saturated thread or setons, bandages, &c., as recommended by some, require skill, and are not only unnecessary, but hurtful. My operation will permit the test of publicity.

At Port Natal, from the unscientific mode adopted, they lose two-thirds, and generally the tails of the few survivors; still they continue it as their only safety, even at this sacrifice. My mode has proved harmless, as will be willingly corroborated by many who have tried it, and a sure preventive of pleuro-pneumonia—the worst scourge that has ever attacked the cattle on a thousand hills.

#### THE RESULTS OF INOCULATION

are, that it has given the greatest satisfaction, except that it occasions in some few cases, to the extent perhaps of one per cent., mild swellings about the passages of the natural evacuation, that may require the hand of the attendant now and then to remove the contents; should these swellings continue, and prove obstinate,



the skin should be cut through at the lowest and the most dependent part, for the escape of the matter, and the wound dressed once or twice a-day with a pledget of tow dipped in a liniment composed of one part of creosote to two of olive oil.

The remainder require no care or attention beyond the ordinary. The benefits, with the above insignificant exception, are, that herds that were threatened by this epizootic contagion—and some few of them had already died, and about five per cent. of the remainder exhibited unmistakable symptoms of initiating the complaint—have had the “spread” stayed; and that, notwithstanding an almost unparalled rainy season from day to day and weeks together after they were operated on, than which a more exciting cause to develop any latent tendency of this lurking disease can scarcely be found, this prophylactic stood the test, and they have remained free up till now. In other herds, which the destroying pestilence had decimated to the extent of one-third, the remaining two-thirds have been saved by its adoption. Moreover, speculators who are now aware of the value of inoculation, eagerly purchase for that operation the cattle belonging to those who have become alarmed, and submit them to the same danger without fear, while others who have sold from fear have since tried to repossess themselves of their own or other cattle as soon as its intrinsic worth dawned upon them.

Many have paid handsomely for instruction, simple as is the operation, considering the safety worth any expense. Instances have occurred of extensive proprietors of stock having had the advantages proved by their own hands and good sense in applying it.

In one case I know as many 3,000 operated on in this colony, the success of which equals my own experience, and the result more than surpasses all that I am acquainted with in veterinary practice, in any or all of its branches put together.

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## DIALYSIS AS APPLIED TO THE DETECTION OF POISONS IN MEDICO-LEGAL CASES.

By EDWARD R. HARVEY, A.M., M.B., Oxon., Lecturer on Physiological Chemistry at St. George's Hospital.

(*From the Lancet.*)

THE following experiments were made in the laboratory of St. George's Hospital, to determine the value of dialysis as a method of separating poisons from organic mixtures, and thus rendering their detection a matter of ease to the medical practitioner. The universal interest that Professor Graham's remarkable investigations excited, and the hope that his discovery would prove available in medico-legal cases, made it desirable to ascertain by experiment if such hopes were securely based. Throughout the experiments, Professor Graham's instructions were accurately observed. A dialyser formed of a gutta-percha hoop, twelve inches in diameter, upon which well-soaked parchment paper was stretched (the whole forming an instrument like a tambourine), was floated in a glass basin of water. This water will be spoken of as the diffusate. To test the materials, a few preliminary experiments with coloured fluids were made, with satisfactory results. When the fluid on the dialyser was coloured by a crystalloid, the diffusate received the colouring matter; when a colloid was the colouring agent, the diffusate remained untinged. The decimal weights and measures were used throughout, as most convenient. The gramme is equivalent to 15.432 grains; the litre is equivalent to rather more than 1 pint 15 ounces; the centilitre, to 2 drachms 43 grains.

To avoid repetition, it may be stated at once, that whenever an organic mixture was placed on the dialyser, a little amorphous matter was invariably found, on evaporation, in the diffusate, at the end of twenty-four hours. How far this interfered with the application of the ordinary tests, the experiments show.

Experiment 1.—A portion of the stomach of a man known to have been poisoned by opium was cut up, and, with its contents, mixed with water, and placed



on the dialyser for twenty-four hours: the outer fluid, or diffusate, was then replaced by fresh water. At the end of the next twenty-four hours, each diffusate was tested in the ordinary manner for meconic acid by sesquichloride of iron. No reaction occurred. The diffusates were then evaporated together to the bulk of an ounce: on this fluid being tested as before for meconic acid, a very faint reddish-brown tinge was produced, but not of a sufficiently decided character to enable any one to swear to the presence of opium.

Experiment 2.—0.500 gramme of powdered opium was digested in water, acidulated with hydrochloric acid, at 32° centigrade, for two hours, and then thrown on the dialyser. In twenty-four hours, the diffusate, without being concentrated, gave ample evidence of meconic acid.

Experiment 3.—One centilitre of laudanum was mixed with three eggs and water, a few drops of hydrochloric acid were added, and the whole thrown on the dialyser. The diffusate was evaporated to a bulk of about two ounces. Evidence of meconic acid was obtained, the reaction being as marked as that produced by fifty drops of laudanum in 2 ounces of water.

Experiment 4.—A centilitre of laudanum was mixed with three eggs and water, and thrown on the dialyser; no hydrochloric acid had been added. The diffusate, at the end of thirty-six hours, neither before nor after concentration yielded any evidence of meconic acid or morphia.

Experiment 5.—Two centiletres of laudanum were mixed with milk; a little hydrochloric acid was added. In twenty-four hours the diffusate had an opalescent appearance, and was so faintly tinged by the sesquichloride of iron solution that no evidence of meconic acid was obtained. The fluid was concentrated, and became turbid from phosphates. A drop of acid in great measure cleared the fluid. A very faint reaction of meconic acid was obtained.

Experiment 6.—Two centiletres of laudanum were poured down a rabbit's throat. The rabbit died almost instantly. The stomach, with its contents, were at once removed, and, with acid and water, thrown on the dialyser. No evidence of meconic acid could be obtained in the diffusate. It should be mentioned that the stomach had no smell of opium whatever when removed from the animal's body.

Experiment 7.—0.05 gramme of sulphate of strychnine was dissolved in water with a little sulphuric acid, and placed upon the dialyser for twenty-four hours. The faintest purple tint was momentarily produced with the bichromate of potash and sulphuric acid on a drop of the diffusate. A portion of the diffusate was concentrated, which gave more and more marked evidences of strychnine being present as it evaporated. Into the remaining portion of the diffusate, after the free acid had been neutralized, a full-grown frog was placed; at the end of three hours it was seized with tetanic rigors and emprosthotonos—quite characteristic of strychnine poisoning upon these animals.

Experiment 8.—Nux-vomica beans were cracked, and for thirty-six hours digested in very dilute sulphuric acid, at 30° centigrade. The beans were now quite soft, and had partially fallen to pieces, and the acid liquor had assumed a brown tint. All was thrown on the dialyser. At the end of twenty-four hours, the diffusate was faintly brown in colour. No purple tint could be perceived until the fluid was concentrated, and the colour then produced was of a very uncertain nature: it was purplish running into pink. Experiments proved that organic fluids containing no strychnine gave an extraordinarily similar reaction with the same re-agents. Further evaporation rendered the characteristic colour less distinct, until the fluid itself was a brown syrup, totally unfit for any colour test. A few drops were placed under the skin of a frog, which, after one or two slight convulsions, became apparently comatose, and in twenty minutes died rigid. Another that was treated in the same way, except that the acidity of the syrup was neutralized, exhibited the same signs of torpor for forty-eight hours, when it died. The remaining syrup was diluted with water, neutralized by carbonate of soda, and a frog placed in it. In two hours emprosthotonos and tetanic convulsions came on. The fluid remaining on the dialyser was poured into a beaker and neutralized, and a frog placed in it,



which was tetanized like the others in about two hours. One frog died in twelve hours; another was killed; and the third, after remaining on its back in a tetanic condition ten days, recovered. The soft broken beans were rolled up with fat into a bolus, and given to a dog, upon whom they had no effect; proving that all the strychnine had been extracted.

Experiment 9.—0.1 gramme of strychnine, dissolved in hydrochloric acid and water, was mixed with three eggs, and thrown on the dialyser. So much organic matter besides strychnine was contained in the diffusate, that neither before nor after concentration could any evidence of strychnine be obtained. The diffusate was evaporated to dryness over water, and the strychnine extracted by ether. The extract, after the ether had been driven off, gave distinctly the reaction of strychnine.

Experiment 10.—0.070 gramme of sulphate of strychnine was given to a dog. In a quarter of an hour he had tetanic convulsions, and he died in half an hour. The stomach and contents, with acid and water, were thrown on the dialyser. The diffusate, on evaporation, yielded a purple tint, exactly of the same dubious character as in Experiment 8. It was evaporated over water to dryness; a brown residue resulted: and a small piece of about the size of a pea was placed under the skin of a frog, which in two minutes was seized with violent convulsions, and died.

It did not appear necessary to carry the investigation further with organic poisons. All experiments led to the conclusion that, small as was the amount of amorphous matter that passed into the diffusate, it was sufficient always to obscure, and sometimes to prevent, the ordinary chemical reactions, although, as was proved by the frogs in the strychnine experiments, the poisonous crystalloid was present in considerable quantity.

Experiment 11.—A small but unknown quantity of potassio-tartrate of antimony was mixed with three eggs and water, and thrown on the dialyser. In twenty-four hours the diffusate, on sulphuretted hydrogen gas being passed into it, became immediately of an orange tint, and soon deposited a yellow precipitate of sulphide of antimony.

Experiment 12.—0.200 gramme of arsenious acid was dissolved in hydrochloric acid, mixed with milk, and thrown on the dialyser for twenty-four hours; the diffusate was then replaced by fresh water, which remained in contact with the membrane forty-eight hours. Each diffusate gave proof of the presence of arsenic, but the second in a fainter degree than the first. All the arsenic was thrown down as tersulphide of arsenic by hydrosulphuric acid. To remove all organic matter, the precipitate was treated with ammonia, and, after filtration, re-precipitated by hydrochloric acid. The tersulphide, when washed and dried, amounted to 0.205, equivalent to 0.165 of arsenious acid.

Experiment 13.—0.010 gramme of acid was dissolved in hydrochloric acid mixed with milk, and placed on the dialyser for forty-eight hours. The diffusate was treated exactly as that in the preceding experiment. The tersulphide of arsenic obtained weighed 0.009, equivalent to 0.007 of arsenious acid.

Experiment 14.—A little arsenious acid (the quantity not weighed), with a few drops of water, was smeared on a cabbage-leaf, and given to a young rabbit. After a portion of the leaf had been eaten, the animal became uneasy, and was found the next day dead. The stomach, cut up, and contents, were digested in water at 30° centigrade, acidified with hydrochloric acid for twenty hours, and then thrown on the dialyser. Abundant evidence of the presence of arsenic was obtained in the diffusate without evaporation.

Experiment 15.—A rabbit was given on a cabbage-leaf 0.020 gramme of arsenious acid. The stomach and contents, after the animal's death, were treated as before. From the diffusate was obtained 0.010 of tersulphide, equivalent to 0.008 of arsenious acid.

Experiment 16.—Two young rabbits, just purchased, were placed in a hutch which had been occupied some months before by rabbits poisoned by arsenic. Fifteen hours afterwards, they were found dead, much of their food being untouched. Their stomachs and contents were treated as usual. The diffusate be-



came of a tawny yellow on addition of sulphuretted hydrogen; and, when concentrated, a dirty-yellow precipitate resulted. This was separated, treated with ammonia, and filtered; the filtrate, which was yellow, on addition of hydrochloric acid, was clouded with a light-yellow flocculent precipitate, soluble in ammonia, so far answering to the reactions of tersulphide of arsenic; but the amount was too small to make it worth while to attempt to obtain a metallic crust by reduction.

Experiment 17.—One gramme of chloride of mercury was digested for four hours with three eggs, hydrochloric acid, and water. The mixture was then put on the dialyser for twenty-four hours. The diffusate was replaced by fresh water, which remained for forty hours. On being concentrated, each diffusate gave strong evidence of mercury, the second containing less than the first.

Experiment 18.—Two dogs were given in meat chloride of mercury (the quantity unknown). They soon vomited up the meat, and continued to vomit mucus and other matter at intervals for some hours. Everything vomited was collected and digested, for forty-eight hours, with hydrochloric acid and water, at 30° cent. The meat had in great measure been dissolved, and the rest was in shreds and pulp, having evidently undergone artificial digestion. The whole was thrown on the dialyser. The diffusate gave strong evidence of mercury, both with the galvanic and chemical tests.

Experiment 19.—To discover if organic matter in any degree interfered with the dialysis of inorganic salts, 0.100 gramme of arsenious, dissolved in hydrochloric acid, was, with water, thrown on the dialyser, and treated as in Experiments 12 and 13. 0.120 gramme of tersulphide, equivalent to 0.96.5 of arsenious acid, was obtained; or 96.5 per cent. of the quantity dialysed. In Experiments 13 and 14, 82.5 and 70 per cent. were respectively obtained.

From these experiments, it appears that metallic poisons are detected far more readily by dialysis than are organic substances; that the presence of colloidal matter does hinder, to some extent, the separation even of the inorganic crystalloids; and that if colloidal matter be placed on a dialyser, a small quantity of it will be found, in twenty-four hours, in the diffusate. Thus, although dialysis may in some medico-legal cases be of assistance to the chemist, it would be dangerous to regard it as a substitute for the old and approved methods of analysis when poison is suspected.

Laboratory, St George's Hospital, Dec. 1862.

## ON FOOD AND DIGESTION.

1. DANILEWSKY, ALEX.: *On the Specifically-acting Principles of the Natural and Artificial Pancreatic Juice*. (Pathol. Instit. of Berlin. Virchow's Archiv, vol. xxv. p. 279.)
2. FEHR, CARL: *On the Removal of all the Salivary Glands in Dogs*. (Virchow's Archiv, vol. xxv. p. 187.)

(From the British and Foreign Medico-Chirurgical Review.)

1. THE researches of Danilewsky led to the following results: 1. The natural and artificial juice of the pancreas shows, outside the organism, three specific physiological reactions: (a) it changes starch into sugar; (b) it dissolves in a characteristic manner coagulated albumen; (c) it reduces the neutral fats into their corresponding acids and glycerine. 2. Each of these reactions depends on a specific substance. 3. Two of these substances, the two, namely, which effect the first and second reaction, can be gained in a more or less pure form. 4. The existence of a third substance which effects the third physiological reaction of the juice, is highly probable. 5. The specific substance which corresponds to the first reaction, acts in a neutral, alkaline, and acid solution, but with different degrees of intensity. 6. The digestion of fibrine in normal, natural, and artificial pancreatic juice, and in a solution of the isolated substance, which corresponds to



the second reaction, has nothing in common with a process of putrefaction, but is effected by a physiological property of the juice, and more especially of the isolated specific substance. 7. This last-named substance exerts its power of digesting fibrine only in neutral and alkaline solutions. 8. The amount of free alkali contained in the solution of the pure specific substance, has a great influence on digestion. 9. A surplus of free alkali and the presence of free hydrochloric acid do prevent the digestion of fibrine in a solution of the specific substance. Danilewsky states further that the first and second specific substances are not pure albuminates, but that they belong to the colloidal matters.

2. Fehr removed all the salivary glands in dogs, and found that no serious symptoms of any kind were developed after the operation. No blood-poisoning took place, which shows that the blood need not necessarily be purified by the excretion of the constituents of saliva through the salivary glands. The only change observed is, that the animals take more water than usual. Digestion does not seem in the least interfered with, and the author thinks that it is not likely that in these cases the function of the pancreas is increased. He did not find that organ at all enlarged after the animal had existed for a considerable time without salivary glands. Sugar was found in the hepatic veins as usual, which shows that sugar is formed in the liver without the aid of saliva.

#### SECRETION; METAMORPHOSIS OF MATTER; ANIMAL HEAT.

1. *Experimental Researches into a new Excretory Function of the Liver, consisting in the Removal of Cholestearine from the Blood, and its Discharge from the Body in the form of Stercorine.* By AUSTIN FLINT, M.D. (American Journal of Medical Science, Oct., 1862.)
2. HOPPE: *On the Presence of the Biliary Acids in Jaundiced Urine, and on the Formation of the Biliary Pigment.* (Virchow's Archiv, vol. xxiv. p. 1.)
3. JAFFE, MAX.: *On the Identity of Hæmatoïdin and Bilifulvin.* (Virchow's Archiv, vol. xxiii. p. 192.)
4. BÖTTCHER, ARTHUR: *On the Formation of the Red Corpuscles of the Blood.* (Virchow's Archiv, vol. xxiv. p. 606.)
5. WALTHER, A.: *Contributions to the Knowledge of Animal Heat.* (Virchow's Archiv, vol. xxv. p. 414.)

1. Dr Flint gives the following summary of his interesting chemico-physiological researches:—

(1.) Cholestearine exists in the bile, the blood, the nervous matter, the crystalline lens, and the meconium, but does not exist in the fæces in ordinary conditions. The quantity of cholestearine in the blood of the arm is from five to eight times more than the ordinary estimate.

(2.) Cholestearine is formed in great part, if not entirely, in the substance of the nervous matter, where it exists in great abundance, from which it is taken up by the blood, and constitutes one of the most important of the effete or excrementitious products of the body. Its formation is constant, it always existing in the nervous matter and the circulating fluid.

(3.) Cholestearine is separated from the blood by the liver, appears as a constant element of the bile, and is discharged into the alimentary canal. The history of this substance in the circulating fluid and in the bile, marks it as a product destined to be got rid of by the system, or on excretion. It pre-exists in the blood, subserves no useful purpose in the economy, is separated by the liver, and not manufactured there, and if this separation be interfered with, accumulates in the system, producing blood-poisoning.

(4.) The bile has two separate and distinct functions, dependent on the presence of two elements of an entirely different character. It has a function connected with nutrition. This is dependent on the presence of the glyco-cholate and taurocholate of soda, which do not pre-exist in the blood, subserve a useful purpose in the economy, and are not discharged from it, are manufactured in the liver and peculiar to the bile, do not accumulate in the blood when the function of the liver is



interfered with, and are, in short, products of *secretion*. But it has another function connected with depuration, which is dependent on the presence of cholestearine, which is an *excretion*. The flow of the bile is remittent, being much increased during the digestive act, but produced during the intervals of digestion, for the purpose of separating the cholestearine from the blood, which is constantly receiving it.

(5.) The ordinary normal fæces do not contain cholestearine, but contain *stercorine* (formerly called seroline, from its being supposed to exist only in the serum of the blood), produced by a transformation of the cholestrine of the bile during the digestive act.

(6.) The change of cholestearine into stercorine does not take place when digestion is arrested, or before this process commences; consequently, stercorine is not found in the meconium, or in the fæces of hibernating animals during their torpid condition. These matters contain cholestearine in large abundance, which also sometimes appears in the fæces of animals after a prolonged fast. Stercorine is the form in which cholestearine is discharged from the body.

(7.) The difference between the two varieties of jaundice with which we are familiar; the one characterized only by yellowness of the skin, and comparatively innocuous; the other attended with very grave symptoms, and almost invariably fatal—is dependent upon the obstruction of the bile in the one case, and its suppression in the other. In the first instance the bile is confined in the excretory passages, and its colouring matter is absorbed; while in the other, the cholestearine is retained in the blood, and acts as a poison.

(8.) There is a condition of the blood dependent upon the accumulation of cholestearine, which I have called *cholesteræmia*. This only occurs when there is structural change in the liver, which incapacitates it from performing its excretory functions. It is characterized by symptoms of a grave character, referable to the brain, and dependent upon the poisonous effects of the retained cholestearine on this organ. It occurs with or without jaundice.

(9.) Cholesteræmia does not occur in every instance of structural disease of the liver. Enough of the liver must be destroyed to prevent the due elimination of the cholestearine. In cases in which the organ is but moderately affected, the sound portion is capable of performing the eliminative function of the whole.

(10.) In cases of simple jaundice, when the fæces are decolorized and the bile is entirely shut off from the intestine, stercorine is not found in the evacuations; but in cases of jaundice with cholesteræmia the stercorine may be found, though always very much diminished in quantity, showing that there is an insufficiency in the separation of the cholestearine from the blood, though its excretion is not entirely suspended. After death, but a small quantity of bile is found in the gall-badder.

2. The following are the results of Professor Hoppe's investigations:—1. Biliary acids are found in the urine in cases of jaundice, and also when they have been previously injected into the blood-vessels. 2. The formation of biliary pigment occurs at such places, and under such circumstances, as forces us to exclude the notion that they are derived from the transformation of the biliary acids. 3. Biliary pigment has not yet been artificially obtained from the biliary acids. 4. It is highly probable, as Kuehne has already suggested, that cholepyrrhin is formed in the blood from the colouring matter of the latter, in all cases in which blood-corpuscles are dissolved by a substance which does not destroy life in the quantity in which it is brought to act. Such a substance, for instance, is water.

3. Jaffe obtained beautiful crystals of hæmatoïdin from the colouring matter of a yellow cicatrix in the substance of the brain, which had formed after an attack of apoplexy. By dissolving these crystals, and by letting them recrystallize, he states that he got the hæmatoïdin in the purified form of bilifulvin, and thinks that this conclusively proves that both substances are identical.

4. Böttcher states, that when a current of oxygen and a current of carbonic acid are conducted through a solution of hæmato-crystallin, a sediment is formed which with the naked eye, appears red and granular. Placed under the microscope, this sediment is found to consist of globular corpuscles, which bear a striking resemblance to the red corpuscles of the blood. Several skilled observers who examined



them, without having been informed about their nature, took them at once for blood-corpuscles. These artificial corpuscles vary in size, but on the average they are as large as blood-corpuscles. Böttcher says that they are, in fact, nothing but blood-corpuscles, and he believes that the true blood-corpuscles of the higher animals are formed, by the process of respiration, in the fluid in which they are floating.

5. Walther made some interesting observations on the influence of refrigeration on animal life. He states that a rabbit the temperature of which has been lowered in a cooling-apparatus to  $+18^{\circ}$  or  $+20^{\circ}$  C., when placed in a medium not warmer than its own body, does not regain its normal temperature of about  $+39^{\circ}$ . (This fact has been already observed by Bernard.) The animals, when taken out of the cooling-apparatus, are unable to sustain themselves on their feet. They lie quiet on their side, and do not make any locomotory movements; but they exhibit phenomena of voluntary motion, reflex motion, and sensibility. The heart beats only sixteen to twenty times in the minute. In some cases respiration is so slight that no movement of the thorax can be seen, in others it is very hurried and superficial. The eyes of the animal are wide open. The lowest temperature at which Walther still observed motion, sensibility, reflex action and will, was  $+9^{\circ}$  C. Animals kept at a temperature of  $+20^{\circ}$  die after some time, and animals which have been previously cooled to  $+10^{\circ}$  do not recover when artificially warmed to  $+29^{\circ}$ , and then left to themselves. Muscular contraction may produce an increase of the normal temperature of a rabbit of  $2^{\circ}$  to  $4^{\circ}$ , but no increase of temperature takes place when the animal has been cooled to  $+20^{\circ}$ . In rabbits which have died, or which have been killed in a state of refrigeration, the lungs are always found much congested and œdematous. Thin serum is also present in the bronchial tubes. The same appearances were also found in animals which, after having recovered their normal temperature, nevertheless died. In these, serum was also contained in the pleural cavities. Refrigerated animals can be made to regain their normal temperature in two different ways: Firstly, by warming them artificially till their temperature has got normal; this takes from two to three hours in a medium of  $40^{\circ}$ . Secondly, the normal temperature can be restored by means of artificial respiration. A rabbit cooled to  $+18^{\circ}$ , and placed in air of  $+10^{\circ}$  or  $+12^{\circ}$ , will recover its warmth, under the influence of artificial respiration, even in this colder atmosphere. Walther thinks that re-animation of persons seemingly dead from the influence of cold, ought not to be effected by slow warming, as is the usual practice, but by a more rapid process.

Some animals which had recovered their normal temperature after refrigeration, were in the first few days in a state of fever, their temperature being  $42^{\circ}$ . Some also suffered from violent catarrh of the lungs, the nose, and the eyes.

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### ON THE TRICHINA DISEASE IN MAN.

By Dr N. FRIEDREICH, of Heidelberg. (Virchow's Archiv, Band xxv. Hefte iii. und. iv. p. 399.)

AFTER allusion to the researches of Virchow, Leuckart, and Zenker into the subject, the author contributes the following case as specially instructive in a diagnostic and therapeutic point of view. We give an abstract of the case, following its general course, without transcribing it verbatim according to dates, &c.

G. M.—, a robust, healthy man, twenty-two years old, whose trade brought him into connexion with sausage meat, pigs' meat, &c., in April of the past year had been working very hard, when suddenly he experienced an excessive weakness in the legs, and excessive painfulness in the muscles of the legs. This was accompanied by headache, heat of the surface, and sweating, thirst, and anorexia. These symptoms increased, and shortly afterwards diarrhœa, and considerable pain and stiffness of the muscles of the arms, loins, and back came on. No lung symptoms or vertigo existed.



When first seen at the hospital, April 24th, the pain in the muscles of the limbs and neck, &c., was very great, specially on pressure and slight contact. The muscles had a hard, tense, india-rubber-like feeling, and were very turgid, and attempts to raise himself in bed produced great pain and stiffness in the back. Power of swallowing, chewing, and speaking was unaffected, and the tongue appeared normal in every way. The abdomen and its organs, as well as those of the chest, appeared natural.

Well-marked febrile symptoms came on, with headache and vertigo, thirst, loss of appetite, and furred tongue. At first there was no albumen in the urine. Delirium and restless nights and diarrhœa. Intense debility and epistaxis came on. The pupils remained natural; special senses natural. Subsequently diarrhœa, with the evacuation of many portions of the tœnia. The affection of the muscles increased, and uprising in bed became impossible. The elbow-joints became somewhat flexed, and much pain was felt on attempts to straighten them; the lower limbs were outstretched. The sweating became profuse, then hoarseness and some dry cough came on, with pain on speaking. The headache, thirst, &c., became less. No exanthematous rash or any splenic enlargement existed, but a slight amount of albumen was then found in the urine. During most of this period (nine or ten days), the pulse ranged from 100 to 114. Subsequently, loose stools were passed, and about this time it appears the pulse became rather lower, but the weakness and pain of the muscles continued to increase. The sweating continued, and much miliary eruption, containing clear fluid, existed on the skin, but nothing like roseola; afterwards, numbers of small pustules, filled with a milky contents, and surrounded by a red basis, arose on the breast and abdomen. Slight diarrhœa continued. The patient then had the picronitrate of potash administered three times a-day. The pimples and pustules extended over the back. The urine became free from albumen, the tongue natural, headache disappeared, and sleep and appetite became natural. *A minute portion of muscle was then extracted by means of Middeldorpf's harpoon from the calf of the right leg, and in the preparation, which was hardly the size of a hempseed, seven partially spiral trichinæ were counted between the muscular fibres.*

The remedy above mentioned was continued. On the 9th of May the affection of the muscles had somewhat diminished, especially in the upper limbs; movement and sitting up in bed were easier. The tense state of the muscles continued. The contracted state of the elbows yet continued, but attempts to straighten them were less painful. The sweating persisted, as also the vesicular eruption; and in addition, large pustules, the size of hempseed, with red circumference, came out in different parts; at the back, on the right side, a black spot, which was very painful, and surrounded by a dark redness, showed itself, and in the neighbourhood of this was a boil of the size of a pea, from which, on pressure, a quantity of brownish pus was squeezed. On examination of this purulent matter, in addition to pus-cells, blood-corpuscles, dead connective-tissue, &c., *a large well-developed trichina was discovered.* Œdema of the ankles came on. An improvement took place in the condition of the muscles as respects stiffness, tension, pain, &c., and also in the contraction of the elbow. The miliary and pustular eruption and sweating continued in fresh crops; and a small very painful boil came out over the right clavicle. The black spot on the back had left behind a clean ulcer. The conjunctiva, owing to the medicine, and the skin of the body, were noticed as of a yellow hue. The symptoms then in all respects improved, but still a little albumen remained in the urine, which had become very dark, owing to the medicine, which was continued. After a time the sweating and the fresh crops of eruptions gradually ceased, and the ulcer of the back healed, and the general strength vastly improved.

No trichinæ were found on a second exploration of the muscles of the leg with the harpoon; but on a third operation later on, a living trichina not yet encapsuled was discovered. The yellow colour of the urine and of the conjunctiva, &c., diminished quickly on leaving off the medicine. Again a portion of the leg muscle was removed without any traces of trichina being found; but



at a still later exploration, the animal was met with. On the 30th of June the patient left the hospital, feeling quite strong.

The author, commenting on the details of this case, notices the absence of shivering in connexion with the commencing febrile symptoms, and draws attention to the *course* of the symptoms, the muscles of the legs becoming affected prior to those of the arms and back; and also during recovery, the improvement also in the legs taking place last of all, these limbs being to a certain degree affected for a length of time after the others had returned to their natural state. The symptoms are referred to irritation of the sensitive muscular nerves and hyperæmia, with convulsive excitation of the muscular tissue, brought about by the important ova of the trichina; the microscopical examination of the muscular fibre removed by the harpoon, more or less in a fatty condition, indicating a regressive disturbance of nutrition. The hoarseness is attributed to the presence of trichina in the muscles of the larynx, and *à propos* allusion is made to the observations of Bischoff,<sup>1</sup> Henle,<sup>2</sup> Virchow,<sup>3</sup> and Leuckart,<sup>4</sup> on their presence in this part; and the persistent diarrhoea is attributed to irritation of the intestinal mucous membrane by the trichinæ, but unfortunately the stools were not examined by the microscope. The excessive sweating is to be associated with a determination of blood to the vessels of the skin, owing to the hardness and contraction of the muscles, and seems comparable to the profuse sweating of tetanus.

The author also looks upon the case as proof of the existence of a trichinous "pustulosis and furunculosis," and explains the abscess of the side of the chest in which the trichina was found, by supposing that the animal had escaped from the muscle into the subcutaneous tissue and set up inflammation: noticing the preference which (as it has been shown by observers)<sup>5</sup> the animal shows for the muscles of the thorax, and for peripheric or superficial parts.

As respects diagnosis, the disease is to be known from acute rheumatism by the *extent* over which the muscular pain exists, also by the freedom of movement of the *joints*; from tetanus, by the absence of trismus and of the exaltation of reflex action; from typhus, by the absence of cæcal pain, of enlargement of the spleen, of the special eruption, of the dry tongue, and of the head and lung symptoms. Moreover, the patient stated that he had latterly been much engaged in the killing of pigs, often placing the bloody knife in his mouth, and eating portions of the sausage-meat.

As respects the therapeutic bearings of the case, it seems that Friedreich was induced to try the pricro nitrate of potash, from having previously observed the manner in which, when given as a substitute for quinine in ague, it quickly tinged the conjunctiva and skin of a yellow colour, and also impregnated silk and other material. Supposing that it must have the power of colouring the human tissues, he was led to give this intensely bitter remedy with a view to its immediate action upon the trichinæ whilst yet existing in the intestinal canal.

In addition to strongly recommending the drug as an anthelmintic in man, he suggests that it ought to be tried in cases of trichinised animals.

<sup>1</sup> Heidelberger Medizin. Annalen, Band vi. Heft 2.

<sup>2</sup> Zeitschrift f. Ration. Med., N.F., vi. 2. 1855.

<sup>3</sup> Archiv. fur Path. Anat., Band xviii. S. 331. 1860.

<sup>4</sup> Untersuchungen über Trichina Spiralis, S. 19. Leipzig und Heidelberg, 1860.

<sup>5</sup> H. Wood: London Medical Gazette, vol. xvi. May 9th, 1835. A. Farre: Ibid., vol. xvii. Jan. 23rd, 1836.



# ON THE OCCURRENCE OF ASCARIS MYSTAX IN THE HUMAN SUBJECT.

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(From the *Lancet*.)

IN this communication I propose to rescue from oblivion a most important contribution to helminthological literature; to offer proofs of the occurrence of *Ascaris mystax* in the human body; and to vindicate the authority and general accuracy of Dr O'Brien Bellingham, and other Irish naturalists, whose statements have been unfairly handled by continental parasitologists.

The late Dr Bellingham, who was one of the surgeons of St Vincent's Hospital, Dublin, published in the thirteenth volume of the "Annals of Natural History," an extended Catalogue of Irish Entozoa; and in this list he recorded the existence of a new round worm in man, under the title of *Ascaris alata*. This catalogue has been constantly referred to by Dujardin, Diesing, and other systematic entozoologists, comparatively few of them having, it would seem, had access to Dr Bellingham's more extended account of this parasite given in the first volume of the *Dublin Medical Press* (No. 7, Feb. 20th, 1839). One is led to make this inference from the doubts which some have cast upon the very existence of the worm; although others, with more candour, suppose the species has merely been mistaken. Thus Küchenmeister ("Parasiten," s. 464; in Lankester's edit., vol. ii., p. 100) says "The *Ascaris alata*, found in the small intestine of a man, is probably only a young individual of one of the long-known Nematoda, *if indeed it be a worm at all!*" (The italics are mine.) This statement is reproduced by Hulme in his English edition of Moquin Tandon's "Elements of Medical Zoology" (p. 341); and the French author himself evidently shares the doubt of other people. Dujardin ("Helminthes," p. 156) admits the species, as does also Diesing ("Systema Helminthum," p. 175); but the latter unluckily adds the following very significant suggestion:—" *Ascaris lumbricoides* capitis epidermide emphysematice inflata?" Dr Leidy of Philadelphia admits *A. alata* among his *Entozoa hominis* without comment ("Smithsonian Contrib." for April, 1853); but Weinland of Frankfort, in his list, prefixes the species with a note of interrogation, observing, also, that it has been "once" found in Ireland ("Essay on Tapeworms," p. 88.) It is quite clear, therefore, that these authors entertain no belief as to *Ascaris mystax* being a human parasite, because those who doubtfully accept Bellingham's *Ascaris alata* do so under the impression that, whatever it is, it is quite distinct from the common ascaris of the cat. The evidence which I shall now adduce is quite conclusive, and ought, once for all, to clear up the mystery.

Dr Bellingham, in his paper, (*loc. cit.*) "On an Undescribed Species of Human Intestinal Worm," remarks that there are three species of ascaris infesting man (*i.e.*, he includes the *A. lumbricoides* and *A. vermicularis*, the latter being now better known as an *Oxyuris*); and he proceeds to notice the third form in the following manner:—

"The third species of the genus ascaris, which occurs in the human intestine, has not hitherto been described (although it would appear to have been already observed in this country); as yet I have met with it only once. It belongs to the third division in Rudolphi's arrangement, and to the subdivision in which the head is winged. From the distinctness of the lateral membranes of the head, I have given it the name of *Ascaris alata*."

Dr Bellingham states that he possessed two specimens, both females; and, having next given a minute description of them, he goes on to remark: "The only instance in which I have as yet met with the *Ascaris alata* was on the occasion of my prescribing for a child, aged about five years, who exhibited symptoms of worms. I ordered some vermifuge medicine, and desired, in case any worms



were voided, that they should be kept. A day or two afterwards the specimens from which I have taken the above description were brought to me ; they were dead when I received them, and I could not learn that the child ever passed any since." Dr Bellingham then refers to a previously published case, where worms "closely resembling" his so-called new species had been "passed by a female residing in the county of Cork," and thereupon concludes his paper with the following statement:—"This species, the *Ascaris alata*, is very distinct from the *Ascaris lumbricoides* of the human subject. In general appearance it is not unlike the *Ascaris mystax* which inhabits the stomach and small intestines of the cat ; it differs, however, in having a greater diameter posteriorly than anteriorly, and in the lateral membranes of the head being broader in the *Ascaris mystax* than they are in the species under consideration. There are some minor points in which they also differ, which will be observed if we contrast the characters of the two species."

So much for Dr Bellingham's interesting record, which appears to me to be singularly clear and accurate, although, as I shall show in the sequel, he has, after all, only been describing a genuine *Ascaris mystax*. In the meanwhile, however, it is necessary to glance at the earlier and still more remarkable communication by Dr Pickells, where considerable numbers of similar ascarides were obtained from a patient, named Mary Riordan, aged twenty-eight years. This case will be found minutely detailed in the fourth and fifth volumes of the "Transactions of the Association of Fellows and Licentiates of the King and Queen's College of Physicians in Ireland." In this instance the first specimen was voided in April, 1822, and on its being submitted to that distinguished naturalist, Dr J. V. Thomson, of Cork, that gentleman writes to Dr Pickells as follows:—"The ascaris resembles most that which is so common an inhabitant of the stomach of a cat (*Ascaris felis*), but it is rather longer in proportion to its thickness." After an interval of one year and ten months (Feb. 1824), we are told that several were passed at one time ; then, again, (Nov. 1825), eleven more, and subsequently, (March, 1826), there was another addition of nine, which were thrown up alive. Taken altogether, Dr Pickells had "seen about fifty of various sizes." These were generally evacuated alive, and, in a majority of instances, without medicine. To use the author's own words, "they came away usually in groups of six or more. I have sometimes," he adds, "found a whole group knit together by the extremities. The common lumbricus (*Ascaris lumbricoides*) was also eliminated in some instances. One measured upwards of a foot."

The mention of the presence of *Ascaris lumbricoides* is particularly important in this case, because some have supposed that Mary Riordan was attempting to impose upon her medical attendants. The case, indeed, is one of singular interest ; for this woman not only passed the before-mentioned nematodes, but also an astonishing number of the larvæ of *Blaps mortisaga*, a coleopterous insect "which inhabits such situations as churchyards." This person had, from superstitious motives, long practised the disgusting habit of drinking water mixed with clay taken from the grave of a clergyman or priest, under the impression that she would thus free herself from "both disease and sin." I have mentioned this, not with the view of now discussing the true and false instances where insect larvæ have been obtained from the human body, but for the purpose of directing attention to the possible or probable sources from which the ova of *Ascaris mystax* may have been derived, and in the sequel I think its importance will be made manifest.

The foregoing communications by Drs Bellingham and Pickells are fortunately accompanied by a few drawings, exact outline copies of which I have here reproduced in order that they may be compared with my original figures given below. Some weeks back, when engaged in preparing a paper "On Human Entozoa," (which I partly read at the recent meeting of the British Association at Cambridge), I took occasion to work out this vexed question as to the genuineness of Bellingham's *Ascaris alata* ; and I must say that whatever doubts I had previously entertained regarding his two nematodes, they were at once dissipated on



viewing the figures given by Dr Pickells in the work above cited, (Vol. IV., Plate III., Figs. 6, 7, 8.)

Having thus, by an examination of these writings, and from my familiarity with specimens of *Ascaris mystax* obtained from cats, arrived at the conclusion that Bellingham's *Ascaris alata* was neither more nor less than *A. mystax*, it is a matter of great satisfaction to myself that I am now enabled to bring forward a third instance of the occurrence of *Ascaris mystax* in the human body, and that, too, under the following clearly-defined circumstance:—

About the middle of last November, Dr Edwin Lancaster, F.R.S., Coroner for Central Middlesex, received from Mr Scattergood, M.R.C.S., of Leeds, a specimen of a nematode worm (one out of eight examples), accompanied by a note explaining the source from which it had been derived. On the evening of the 21st of November, Dr Lancaster called my attention to this parasite, and most kindly and unselfishly permitted me to examine it at leisure, with the view of making any further use of it which I might think advisable. On seeing it, I did not doubt for a moment we had stumbled upon a genuine *Ascaris mystax*, and therefore at once, with Dr Lankester's consent, putting myself in communication with Mr Scattergood, the latter gentleman, on the 22nd of November, obligingly favoured me with the following important particulars:—

“I have great pleasure in sending you herewith three more of the entozoon, and, should any others be found, will gladly send you the recent specimens. The eight entozoa, of which you now have four, were passed early in this month, after a few days of diarrhœa and fretfulness, by a child *thirteen months* old, the son of a respectable merchant in this town. I have made careful inquiries respecting the child's food, &c., and have every reason to believe the following account is correct. The child, though suckled to the age of seven months, had also been fed with milk-and-water, sweetened with loaf sugar. At the age of eleven months, flour, oatmeal, or ‘rusk’ was added to this, and subsequently a little bread, farinaceous puddings, potato with gravy, soup, and broth. The water used was that supplied from the Leeds waterworks. It was not filtered, but was always boiled before adding it to the milk. The child very rarely drank water by itself; if he ever did, it was filtered water, as used by the rest of the family. During the last two months or more, he occasionally sucked a piece of meat, but it was always taken from the cooked joint eaten by the family; he never had raw meat or uncooked ham. During the last two or three months or more, the nurse had frequently given him a *piece of celery* to chew; of this he was very fond. He had not been from home for some months. . . . The child's general health had been good; no worms had been seen in the evacuations previously. After the worms were shown to me, I gave a dose of castor oil, and examined the fæces. I found in them several white filaments, which proved to be bundles of vegetable vascular tissue and spiral vessels—evidently from the stalks of celery. After this the diarrhœa ceased, and though the evacuations have been frequently examined since, no other entozoa have been found.”

Nothing could be more explicit or better to the point than this information; but having observed the extreme incredulity of foreign parasitologists (especially Dr Kuchenmeister) in regard to other equally well ascertained facts, I resolved, at the risk of proving troublesome, to make certainty doubly certain, by suggesting to Mr Scattergood the possibility of deception having been practised upon him. His reply to my second letter is equally satisfactory, and runs as follows:—

“The possibility of fraud, or of mistake, was not overlooked in my inquiries. The proof of the presence of the parasites in the child's evacuations depends, not on the evidence of the nurse, but of the mother, who is an intelligent person, and the daughter of a medical man. . . . The celery was probably the means of introducing the entozoa. The market gardens about large towns are often watered from ponds or streams which may contain all manner of abomination.”

The opinion here enunciated by Mr Scattergood is one with which I am fully disposed to agree, seeing that it accords in the main with the conclusions deducible



from numerous recent experiments, made with the view of ascertaining the development and migrations of the Nematoda. Thus, for example (as I have elsewhere remarked), in the case of the closely allied *Ascaris lumbricoides*, the independent investigations of Richter and Davaine, with fresh eggs, "only go to prove that after the ova have escaped passively, *per vias naturales*, they complete their embryonic development whilst free in open waters. In Richter's experiment, none of the embryos had emerged from the eggs, although they had been in water eleven months; whilst the previous investigations of Verloren with the eggs of *Ascaris marginata* of the dog showed that the young embryos can retain their vitality for more than a year after their worm-like condition has been attained." After a similar manner, the escaped ova of *Trichocephalus dispar* require a period of six months after their expulsion before the embryonic condition is fully attained; but in the case of *Ascaris osculata* infesting the seal, my own recent experiments go to prove that the embryonic development may be completed a few days after the eggs have escaped into open waters. On the whole, therefore, it has become evident that some round worms pass through their early development much quicker than others; and in the case of those which do not produce their young viviparously, it is necessary that the ova become immersed in water for a longer or shorter interval; and it is chiefly through this aqueous medium that they gain access to our bodies. Before very long, we hope to be able to give a complete record of the history of the development of each individual species which infests the human body; but those who have not practically attended to these inquiries can scarcely be aware of the numerous difficulties which our investigations in this direction have to encounter.

Leaving now, therefore, the question as to the mode of immigration to the human host, it remains for me to direct more particular attention to the specific characters of *Ascaris mystax*. The figures [as in *Lancet*] with their explanatory references below, will indicate the leading points to be observed; but I may especially remark upon the circumstance, that the so-called "wings" of the head vary considerably in different individuals. This occurs without relation to sex, the *alæ* being strongly pronounced and broad in some, whilst in others they are attenuated and inconspicuous. The stress, therefore, which Bellingham and others lay upon these appendages, in view of determining specific differentiations, is utterly valueless, at least in so far as mere size and conspicuity are concerned; but when variations of outline—constant within certain limits—are found associated with other peculiarities, either of structure or habit, then the question of specificity is fairly raised. In the present case I entertain no shadow of doubt as to the identity of Bellingham's *Ascaris alata* with Dr Pickells' nematode, "similar to the supposed *Ascaris felis*," and with Mr Scattergood's round worms, which I have here carefully figured; they are all examples of the ordinary *Ascaris mystax* of the cat, with which helminthologists are perfectly familiar.

In executing the magnified views which I have given, I was careful to employ a camera to ensure accuracy; but this plan was evidently not pursued in the amplified representations given by Drs Bellingham and Pickells. I mention this, not to cast a slur upon their extremely interesting communications, but to caution systematists against relying upon comparative differences of outline, when these would not have been so strongly indicated if the same method had been pursued by these authors in delineating the ascarides which came under their observation. On this subject I might say much more, but having, as I think, fairly proved that the *Ascaris mystax* should henceforth be numbered among the human entozoa, I venture, before concluding, to offer a complete list of all the helminths liable to infest the human body, and finally to furnish a few general remarks which the occasion legitimately suggests. This list is similar to the one I recently exhibited at the Cambridge meeting of the British Association, but to render it more useful to professional readers, I have added in most instances one synonym, lest the titles here adopted (on more modern principles of entozoological classification) should embarrass those who have not kept pace with our rapidly advancing science:—



1. *Fasciola hepatica*, Linnæus. (*Distomo hepaticum*, Abildgaard.)
2. *Distoma crassum*, Busk. (*D. Buskii*, Lankester.)
3. *Distoma lanceolatum*, Mehlis. (*Fasciola hepatica*, Bloch.)
4. *Distoma ophthalmobium*, Diesing. (*D. oculi humani*, Gescheidt.)
5. *Distoma heterophyes*, Siebold. (*Dicrocoelium heterophyes*, Weinland.)
6. *Bilharzia hæmatobia*, Cobbold. (*Distoma hæmatobium*, Bilharz.)
7. *Tetrastoma renale*, Delle Chiaje.
8. *Hexathyridium Pinguicola*, Treutler, (*Polystoma Pinguicola*, Zeder.)
9. *Hexathyridium venarum*, Treutler. (*Linguatula venarum*, Lamarck.)
10. *Ascaris lumbricoides*, Linnæus. (*Lumbricus teres hominis*, Tyson.)
11. *Ascaris mystax*, Rudolphi. (*Ascaris cati*, Schrank.)
12. *Trichocephalus dispar*, Rudolphi. (*Ascaris trichiura*, Linnæus.)
13. *Trichina spiralis*, Owen.
14. *Filaria Medinensis*, Gmelin. (*Dracunculus Persarum*, Kämpfer.)
15. *Filaria lentis*, Diesing. (*Filaria oculi humani*, Nordmann.)
16. *Strongylus bronchialis*, Cobbold. (*Filaria bronchialis*, Rudolphi.)
17. *Eustrongylus gigas*, Diesing. (*Lumbricus in renibus*, Blasius.)
18. *Sclerostoma duodenale*, Siebold. (*Anchylostoma duodenale*, Dubini.)
19. *Spiroptera hominis*, Rudolphi. (*Lpiroptera Rudolphii*, Chiaje.)
20. *Oxyuris vermicularis*, Bremser. (*Ascaris vermicularis*, Linnæus.)
21. *Tænia solium*, Linnæus. (*Tænia humana armata*, Brera.)
22. *Tænia mediocanellata*, Küchenmeister. (*Tænia cucurbitina grandis*, saginata, Goeze.)
23. *Tænia acanthotrias*, Weinland.
24. *Tænia flavopuncta*, Weinland.
25. *Tænia marginata*, Batsch. (*Tænia ex cysticerci tenuicollis*, Küchenmeister.)
26. *Tænia echinococcus*, Siebold. (*Tænia granulosa*, Gmelin.)
27. *Tænia nana*, Siebold. (*Tænia Egyptica*, Bilharz.)
28. *Tænia elliptica*, Batsch. (*Tænia canina*, Pallas.)
29. *Bothryocephalus latus*, Bremser. (*Tænia hamana inermis*, Brera.)
30. *Bothryocephalus cordatus*, Leuckart.

Into details regarding any of the above thirty species I do not now propose to enter; but I may be permitted to remark, that I have recently given elsewhere a *resumé* of most of the more important facts which have lately been brought to light by the combined researches of modern investigators, and in this memoir (which will shortly be published in the Zoological Society's Proceedings<sup>1</sup>) I have also given a complete synonymy of every species, allocating all the larval forms under their respective adult titles. The novelty and utility of this plan will, it is conceived, render it useful as a medium of reference, whilst at the same time it will, in some measure, explain the reasons of our altered nomenclature.

In regard to one of the above-named species, however, it is incumbent upon me to say a few words. I allude to the little *Oxyuris vermicularis*, respecting which an astounding statement not long ago appeared in the pages of the very same journal to which we are so deeply indebted for Dr Bellingham's communication. The passage to which I refer (*Dublin Medical Press* for Jan. 15th, 1862, p. 76) is headed "Ascarides in Children," and runs as follows:—

"Dr Kidd, finding chloroform useful in destroying these pests of infant life, was led to examine them and give his opinion, held for several years, that they are the larvæ of house flies. Dr Brinton and Dr Lionel Beale, on continuing the subject, have microscopically examined the worms, and have discovered that Dr Kidd's opinion is correct."

The absurdity of the view here promulgated is so gross that I am at a loss to understand how any member of the profession could advance it, especially since it has been known for ages that these so-called *ascarides* are sexually mature animals, the females displaying in their interior multitudes of characteristic nema-

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<sup>1</sup> Part iii. for 1862, vol. xxx., which will appear in February next, and may be had of Longmans & Co., or of Mr Fage, Assistant Secretary of the Zoological Society, 11 Hanover Square.



toid ova—a feature certainly not exhibited by any dipterous larva. I am happy, however, to be able add, that Professor Beale, F.R.S., has informed me that the above statement has been published without his knowledge or concurrence.<sup>1</sup>

In conclusion, I may perhaps be permitted to tender my thanks to those members of the profession and others who, by the transmission of specimens and works, have materially aided me in my investigations, the results of which have been recorded in the “*Linneæan Transactions*” and elsewhere. In particular I may mention Professor Leuckart of Giessen; Dr Diesing of Vienna; Dr Weinland of Frankfort; Dr Claparede of Geneva; Dr Pagenstecher of Heidelberg; Professor Lawson of Kingston, Canada; Professor Busk; Dr Baird; Professor Simonds of the Veterinary College; Mr Canton; Dr Leared; Mr Flower; Dr Sanderson; Mr Hulke; Mr F. Buckland; Dr Hughlings Jackson; Drs Haldane and W. Turner of Edinburgh; Mr Frederick Turner of Sheffield; Mr Murray of Brighton; Dr Lowe of Linn; Dr M‘Intosh of Perth; Mr Bartlett of the Zoological Gardens; and especially Dr Lankester, and Mr Scattergood of Leeds, who by their valuable contribution have most kindly enabled me not only to establish the proof of certain previously recorded facts (which Dr Küchenmeister and others almost, if not entirely, regarded as mere myths), but also to extend in some degree the borders of helminthological science.

Norland Square, Notting-hill, Jan., 1863.

## THE FRONTAL SINUSES OF BOS BUFFALUS.

By SHIRLEY HIBBERD.

(*From the Intellectual Observer.*)

IN making a sectional division of a skull of *Bos buffalus*, the immense development of the frontal sinuses were a matter of surprise; and as but few sections of heads of this and other species of *Bos* have been published, it was thought advisable to place the section in the hands of the engraver. The animal which supplied this skull was full-grown and of grand proportions. The horns were remarkably symmetrical, and in every respect conformable to the figure and description of the species in Vasey’s monograph of the genus *Bos* (p. 76). The characteristics of the species are, convex forehead, horns flattened at the base, bent down, and recurved at the tip. The *Arnee* is said to be a variety of the species with larger horns, not bent down.

Placing the section aslant at an angle of  $45^{\circ}$ , with the occipital below, we have presented to view the sawn face of the section, extending through the frontal and temporal bones, just above the plane of the auditory foramina, and within the eighth of an inch of the foramen magnum. The brain-case is large and deep anteriorly, the sphenoid considerably depressed, optic foramina small, the structure of the whole dense and heavy, the diploë in some places scarcely distinguishable from the external tables, which are hard as flint. It will be seen by the cut that the frontal forms a huge protecting shield over the brain-case, and that it projects right and left by horn-like processes, and is throughout its whole bulk divided into a series of partitions or sinuses, the walls of which are arranged symmetrically. They are very dense, and the spaces between them vary in form and size, though if a vertical line be drawn through this portion of the skull at the sagittal suture, the sinuses on one side are very exact counterparts of those on the other. From the upper exterior edge of the frontal at the sagittal suture, to the sectional line over the foramen magnum, the measurement is  $7\frac{7}{8}$  inches. The extreme width of the frontal, measured from the extreme points of the horn-like projections, is  $11\frac{1}{2}$  inches. The two lateral sinuses differ slightly in size; that on the left hand in the cut, measures  $3\frac{7}{8}$  inches in length, and  $1\frac{5}{8}$  inches across at its widest part, by a line drawn across it vertically. The other has a length of  $3\frac{5}{8}$

<sup>1</sup> Dr Brinton has also contradicted having made any such statements.



inches, and  $1\frac{7}{8}$  inches respectively. The loss of a portion of the intersecting walls of the sinuses to the right of the sagittal suture, was owing to an accident in making the section, owing to the extreme hardness of the bone. . . . .

Many reasons may be conjectured to account for the peculiar structure of the frontal. It evidently possessed immense strength, both for the support of the horns and for their use as weapons of offence. But it is worthy of notice that this buffalo is semi-aquatic in its habits, and thrives best in regions most affected with malaria. May not the sinuses be in some way connected with the function of respiration, to enable the creature to bear submersion some length of time while fording a stream, or when taking shelter in the waters from the myriads of insects which annoy it?

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*Recueil de Médecine Vétérinaire.* September to December, 1861.

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I.—EXTRAORDINARY CASE OF CONVULSIONS IN A HORSE—CURE. By M. MOTTET, Veterinarian at Goissons (Asne.)

A Hungarian horse, aged nine years, used by M. Mottet in attending to his practice, was one day found standing in the stable with the sweat running from all parts of his body, respiration greatly accelerated, the circulation not so much affected; the pulse full and hard, being from 55 to 58 per minute; the conjunctiva greatly injected. There were no symptoms of abdominal pain, but there was a general trembling or quivering of the whole body. The slightest noise, or the presence of a bright light, terrified and excited the animal to an extraordinary degree. The neck was rapidly jerked to either side of the body by the alternate contraction and relaxation of the muscles. The ears were constantly moving from behind forwards, and from before backwards, these movements numbering about 18 or 20 in a minute. All the muscles of the body were called into violent action, which, however, was not persistent; the muscles of the back contracted with such force that M. Mottet was afraid that the spine would be fractured. Ether and laudanum were administered in the first stages, which treatment was followed up by the administration of aloes and sulphate of soda. The patient recovered, but M. Mottet could not trace this sudden attack to any cause, as his horse was a good worker, and up to the time of this sudden affection was in perfect health. He does not attempt any explanation of the nature of the malady, which appears to him to be inexplicable.

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II.—SUB-ACUTE NON-CONTAGIOUS BRONCHI-PNEUMONIA OBSERVED IN A COW THE FIFTH DAY AFTER CALVING. By M. CHARLIER, Veterinarian to the Imperial Parisian Omnibus Company.

The main object which M. Charlier has in view in writing his paper on the above subject is to signalise the existence of a physiological function consecutive to parturition, which appears to be ignored in the cow, and the suppression of which was the cause of the malady related by M. Charlier. The treatment consisted in bleeding, setons, blisters, vapour-baths, and the administration of sulphate of soda. The cow recovered. In regard to the cause, however, M. Charlier states that it was due to a sudden chill, which is at all times dangerous, but is especially so during the first few days after parturition, as at that time both the skin and the mucous membrane of the respiratory passages take on an activity which they do not possess during gestation, the fibrine predominates in the blood, and there is an excessive activity in the organic functions, on account of the excess of that fluid which is, to speak figuratively, without employment during that time in the economy. In this cow there was a sudden stoppage of the glairo-sanguineous discharge, which takes place immediately after calving. The occurrence of this discharge is essential, in order that the uterus and other parts of the generative apparatus may return to their normal condition. In the bovine female this discharge is intermittent, which is attributable to the horizontal position of the



uterus and vagina, in which these matters are deposited in proportion as they are excreted, and only escape when the cow makes expulsive efforts in order to expel them, or during the act of urination. M. Charlier attributes the cause of the disease in his patient to the arrest of this secretion, to the maintenance of which human physicians attach great importance in the human female after parturition.

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III.—M. LEDRU, Veterinarian at Pont Sainte-Maxence, in a letter to the editor of the *Recueil de Médecine Vétérinaire*, gives it as his opinion that anæmia is contagious. He states that cases have come under his observation in which horses in good condition have been suddenly affected with anæmia on being placed in stables formerly occupied by anæmic horses. M. Ledru's facts are not sufficiently numerous to establish the proposition he lays down.

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IV.—CAN A SURGICAL OPERATION, SUCH AS THE SIMPLE SECTION OR THE EXTIRPATION OF A PART, OR, LASTLY, THE LIGATURE OF THE VASA DEFERENS, WHICH PRODUCE OBLITERATION OF THAT CANAL, BE CONSIDERED AS A METHOD OF CASTRATION? By A. GOUBAUX, Professor of Anatomy at the Veterinary School of Alfort.

This method of castration does not prevent the secretion of the seminal fluid, but any of the methods above referred to produce obliteration of the vasa deferens, and, consequently, the seminal fluid cannot be conveyed from the testicle to the urethra. Though the animals which have been operated on by any of the above methods cannot fecundate females, yet the sexual appetites are not extinguished; and, consequently, one of the main purposes of castration is not fulfilled. Any of the methods above referred to cannot therefore be considered as advisable methods of castration. All the phenomena of sexual intercourse are observed in animals castrated in the above manner, but, as already mentioned, they are incapable of fecundating females.

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## MISCELLANEA.

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MORBID APPETITE IN SHEEP.—It has been noticed in countries where sheep are housed in winter, that these animals not only acquire a great disposition to lick themselves, but to tear the wool off each other and swallow it. This has been attributed to feeding sheep on sloppy food, and not allowing them the solid vegetable aliment which is natural to them at that season of the year. Hair concretions form in the stomachs; the animals do not thrive, and destroy their fleeces. All this is prevented by allowing them sound hay. As the morbid habit becomes confirmed, in some cases it is essential to separate the animals, and smear the wool with bitter and disagreeable substances. The disease has been termed Pica in Germany.

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DISEASE AMONG SHEEP IN WEST CUMBERLAND.—We regret to say that accounts from the west of Cumberland speak of the ravages of a very virulent disease among sheep. It is reported that "whole flocks have been swept away" by this malignant rot, which is described as a disease hitherto unknown in Cumberland.—*Bell's Weekly Messenger*.



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### ORIGINAL COMMUNICATIONS AND CASES.

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*Soundness in Horses.* By JOHN GAMGEE, Principal of the New Veterinary College, Edinburgh.

#### ARTICLE VI.

Disorders of the digestive organs continued.—Bots in the stomach.—Perforation of the stomach.—Relapsing colic due to organic disease of the intestine, or to calculi. Hernia.—The French law as to intermittent hernia.—Diseases of the liver.—Hæpatirrhœa. — Abscess. — Gall stones. — Diseases of the urinary organs.—Nephritis.—Hæmaturia.—Albuminuria.—Calculi.—Retention of Urine.—Diseases of the Respiratory Organs.

**BOTS IN THE STOMACH.**—The larvæ of *œstrus œqui* are often found in large numbers adherent to the left or cardiac end of the horse's stomach. Several hundreds are found attached by the two short, black hooks which pierce the mucous membrane. The eggs of *œstri* are carried into the horse's stomach in the months of July and August, and in warm countries as early as June, and as late as September. The larvæ then remain fixed in the stomach until the succeeding spring, and when in excessive quantities, prevent horses getting into good condition.

The question as to whether bots exercise a salutary influence or not on the animal whose stomach they inhabit, has been settled by my father, so as to leave no doubt that Bracy Clark's notion as to the bots stimulating the stomach into healthy action were erroneous. In connection, however, with veterinary jurisprudence, the question has been mooted whether an animal could be killed by bots in its stomach. The instances in which they have induced fatal injury are so rare, and the cases recorded have been so complicated, as to enable us to determine that the lives of horses in this country are not endangered from the attacks of bots. The cases of perforation of the stomach that have been recorded belong to that class recorded by John Hunter, in which there is a post-mortem digestion of the coats of the stomach by the gastric juice. Such perforations occur in animals of all kinds, and without parasites in their stomachs. We cannot attribute any importance to the observations of those who have declared that the stomach was perforated in five or six places by bots, because no satis-



factory evidence is adduced to show that the gastric juice did not soften and destroy the walls of the stomach. In fact, we know that the bot does not gnaw and lacerate, but holds on by firm hooks. It has the power of changing situation, and this explains the occasional adhesion of bots in the external wall of a perforated stomach.

The aperture due to the solvent force of the gastric structures has been described as an irregular, ragged hole, with gelatinous pulpy margins of great tenuity, which break down under the slightest force, a condition often extending over almost the whole of the organ. Dr Brinton, in his interesting work on "Diseases of the Stomach," says of this lesion that "there are no evidences of inflammation on the one hand, or putrefaction on the other; the antiseptic action of the gastric solvent remarkably controlling the latter decomposition in most cases, and, as a rule, little congestion is present; the process apparently occurring at a date prior to the ordinary hypostasis that follows death, and preventing this change by a specific effect on the vessels or their contents. Hence the whitish or yellowish-grey appearance of these softened and perforated stomachs is a character which aids to distinguish them from ordinary specimens. But in many cases, even the perforation of the stomach by no means ends this process of solution, which extends to other structures thus exposed to the action of the gastric contents, and softens and erodes the neighbouring liver, spleen, or diaphragm, or even the lung itself, after the perforation of this septum."

It is interesting to observe that, in man as in the lower animals, this process of perforation usually attacks the cardiac end of the stomach, and may destroy the coats of the organ in several places simultaneously.

It is very important, in connection with the subject of veterinary jurisprudence, to point out as established truths, Firstly, That bots abound in the stomachs of all horses exposed in the summer months to the attacks of the bot fly, by being turned out to grass. Secondly, That the bots have no tendency to induce organic disease of the coats of the stomach, though, when in excessive quantities, they may prevent a horse getting into good condition.<sup>1</sup> Thirdly, Perforations of the stomach, occurring when bots abound in this organ, do not differ from the perforations frequently witnessed as the result of the action of the gastric juice on the cardiac walls.

RELAPSING COLIC.—Horses are not unfrequently sold when they have been unusually troublesome to their owners, from repeated attacks of colic, which threatened to end in death. Several cases of this description have come under my notice. They occur in cart horses as a rule, and most frequently amongst millers' horses, and are due to calculi, which consist either in solid masses of excrement, or in phosphatic deposits around bits of metal, grit, &c., or in spheri-

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<sup>1</sup> My father's experience on this point is most valuable. See *Edinburgh Veterinary Review* for July, 1858.



cal masses of undigested oat hairs, deposited in stratified layers. Lastly, There are concretions of a mixed character.

As a rule, the calculi are single, and may attain a very large size. Sometimes there are several calculi in the large intestine, and the veterinary surgeon is aided in his diagnosis by the discharge of a calculus per ano. The discharged calculi are usually of the phosphatic kind, requiring a long time to form. It is generally possible to determine if the calculus expelled has been the only one formed, for wherever the concretions are multiple they lose their spherical form by attrition against each other, and the calculus is seen flattened on one or more sides.

In the event of a horse discharging such a concretion, and suffering from attacks of colic, it is important to determine the length of time that the calculi take to form. That their formation is slow cannot be doubted. Sometimes the stercoral concretions, may attain great firmness in two or three months. Phosphatic calculi are much more slowly formed, but Fürstenberg has calculated that one of these concretions, weighing 14 pounds, could be formed in twelve months. It is evident, that when a veterinary surgeon is called upon to give evidence as to the length of time an animal must have had a concretion in its intestine, it behoves him to inquire carefully into the history of the case, as well as taking into consideration the size, number, and character of the intestinal concretions.

When an animal dies of colic shortly after purchase, our attention is turned to the condition of the abdominal organs, with a view to determine if, from the existence of concretions in the intestine, or from some chronic organic lesion, we can obtain a clue as to the animal's unsoundness at the time of sale.

Some remarkable organic lesions have been found after death in cases of apparently simple colic. The only interest attaching to these cases in connection with the question of soundness, depends on the possibility of an animal being sold as a perfectly healthy one, and turning out the reverse. Several cases have been recorded in which the epiploic appendices have increased in size, and been transformed into pedunculated tumours, which have been coiled round the intestine, and have led to fatal obstruction. The annexed engraving (Fig. 1) is reproduced from one published in 1829, by Mr Goodwin.

A good illustration of the difficulty experienced in determining the condition of internal organs in animals is afforded by a case which occurred in the Alfort College. An animal was killed for the purposes of the dissecting room, and after death an old-standing invagination was discovered. The annexed cut (Fig. 2) is a reduction of a drawing I made in Paris, and shows the portion of the cœcum in the large colon.



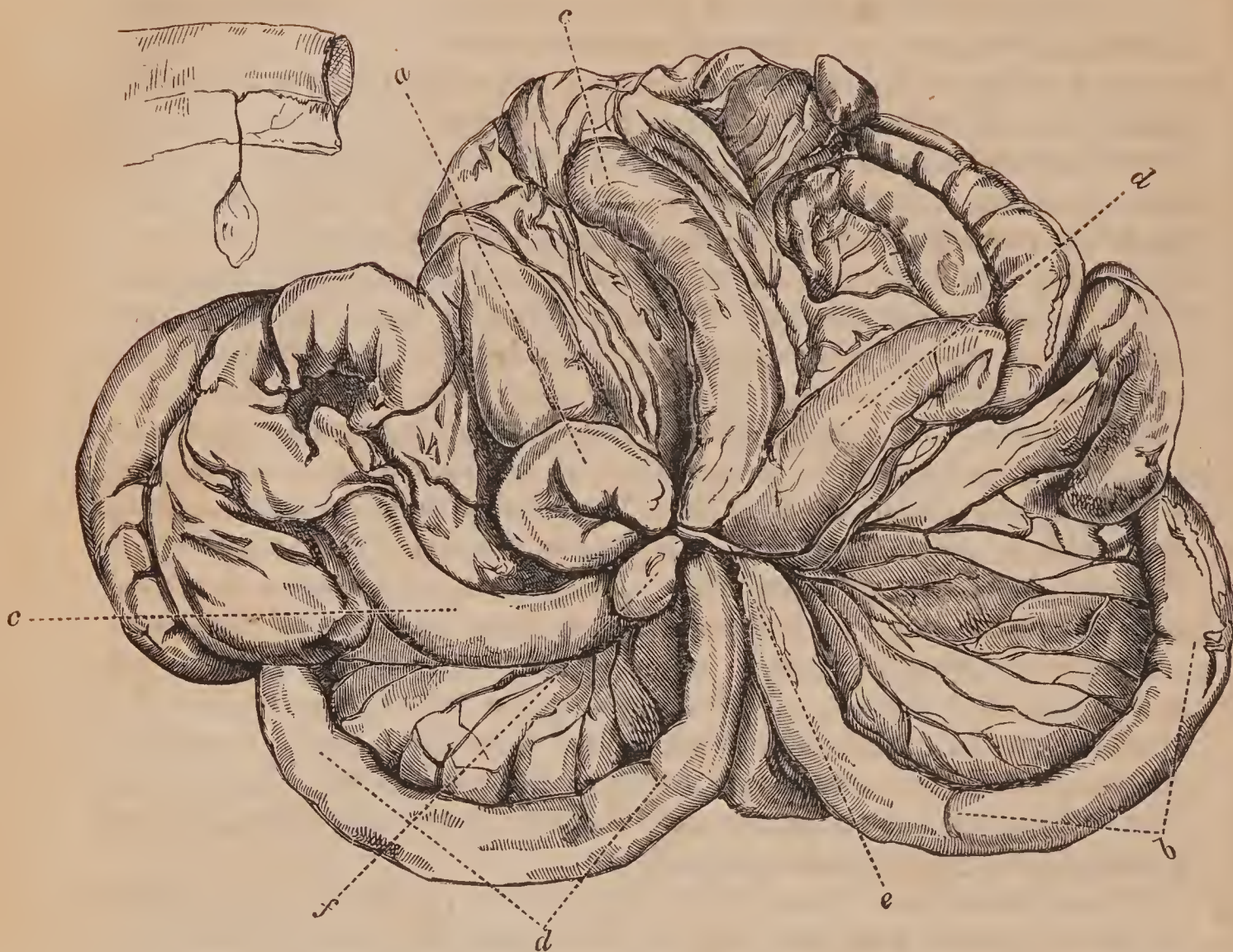


Fig. 1.

*a.*—The strangulated knuckle of intestines which, from stricture and obstructed circulation, had become green and gangrenous.

*b.*—The continuation of the portions of the ileum.

*c c, d d.*—Continuous portions of the same intestine (the ileum), also included within the stricture.

*e.*—The chord which formed the stricture.

*f.*—The fatty tumour hanging from the chord, which was in fact a hypertrophied epiploic appendix.

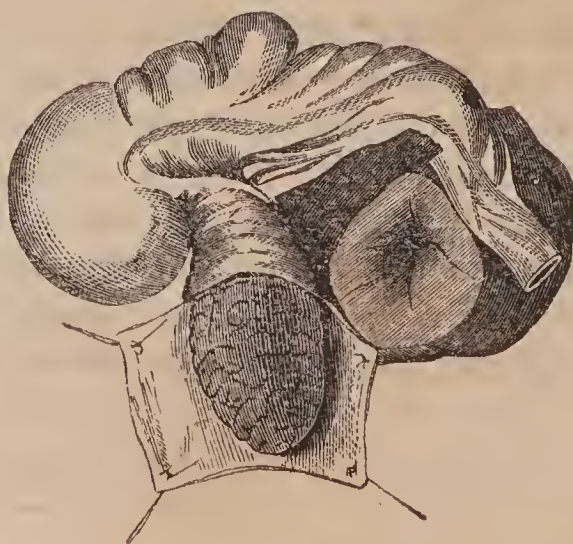


Fig. 2.



I have, in the next place, to notice a lesion which is much spoken of in France, where many entire horses are worked, and which in that country constitutes a defect, rendering an animal liable to be returned. It is—

**INTERMITTENT INGUINAL HERNIA.**—This lesion consists in the temporary descent of a portion of small intestine into the scrotum. Such herniæ are reducible with a large opening, through which the intestine occasionally recedes. Huzard pointed out the fact, that inguinal hernia, having a tendency to disappear and recur, was very rare, and he considered that all small ruptures which would elude observation at purchase should constitute redhibitory vices. Galisset and Mignon, in their treatise on “Veterinary Jurisprudence,” state that inguinal hernia which totally disappears, without direct reduction, must be very rare, but even by the French law an animal may be returned in which there is a hernia of long standing, that is apt to vary considerably in size at different times from change in the volume of its contents. The object of the law is to prevent fraud on the part of dealers who can resort to tricks, such as the reduction of a hernia, and sell a horse as sound.

Inguinal hernia occurs in geldings as well as stallions, but far more rarely. I remember seeing a case in Edinburgh in 1856, in which the hernia had to be reduced to relieve the severe symptoms of colic dependent on strangulation.

In examining entire horses, it is the duty of the veterinary surgeon to look at the scrotum, which is found large and tense in cases of hernia. The form of the included intestine is sometimes observed through the scrotum, and the opacity of the tumor, as well as the thickness of its neck, distinguishes the case from one of hydrocele.

Animals affected with hernia are apt to be seized with symptoms of strangulation when at work. The principal point of difficulty met with, in cases of intermittent hernia, has been to fix the date of the first appearance of the lesion to a period antecedent to the sale of the animal. In France the law is, that if an animal is seized with violent colic, and is recognised as having hernia within nine days after sale, it can be returned to the seller, and in the event of the animal dying, the purchaser claims the value. Although it is often impossible to declare that a hernia has pre-existed the time of sale, it is sometimes difficult to determine if a hernia is at all chronic, owing to the heat and engorgement, indeed, the symptoms of acute derangement which occur in connection with strangulation.

It is a rule which should especially be attended to in cases of colic in stallions newly purchased, that the inguinal rings are to be felt per rectum, so as to determine the existence or not of an inguinal hernia.

**DISEASE OF THE LIVER.**—Disputes have arisen from horses dying shortly after purchase, and the liver found much larger than natural. In one case, the liver weighed 32 lbs., or nearly three times its normal weight. Professor Dick has stated in a court of law, that he had



known a liver enlarged twice its natural dimensions in less than a week. This assertion is very vague, as it is essential to know what caused the enlargement. In cases of hepatitis there is not usually such a rapid increase in size, and in the instances of fatty degeneration, granular softening, &c., the disease is usually found of a very chronic character.

It is in cases of softening of the liver, attended with occasional partial hæmorrhage, that disputes arise. The disease occurs in aged horses in high condition. The animals are dull, fat, with sleek coats, palor of the visible mucous membrane, and show symptoms of jaundice. At intervals varying from one to two, or three months, symptoms of abdominal pain and internal hæmorrhage come on. Partial recovery occurs from repeated attacks, but ultimately a fatal hæmorrhage into the peritoneal cavity occurs from the fibrous capsule of the liver giving way.

The history of the case usually affords a clue to the commencement of the disease; but if a veterinary surgeon has to form an opinion from what he can himself see and no more, it is important to note the extent to which the liver is enlarged and altered, and to obtain evidence of the number of partial ruptures which have occurred at different times. By these means it is possible to determine if the case is a very chronic one, or only of recent origin.

Amongst the chronic liver diseases we have the obstruction to the bile ducts by gall stones, which are attended with severe symptoms at times, and a fatal colic has been observed due to the passage of a large calculus in the bile duct. It is sufficient to know that all these calculi are of slow formation, taking usually months to form.

It has been observed that, in acute and chronic liver diseases, horses manifest intermittent and sometimes constant lameness in the off fore leg, and much more rarely in the near fore one. Mr Percivall has drawn attention to this in his "Hippopathology." He says:—

"Lameness of the fore leg, in hepatitis, has been observed both by English and French veterinarians—'Ce qui est remarquable,' says D'Arboval, 'il boite quelquefois *du membre antérieur droit*, ce qui semble indiquer que la douleur s'étend jusqu'à l'épaule, comme dans l'homme.' The most interesting case I am acquainted with of this description—one that bears striking analogy to the pain referred to the right shoulder in human medicine—is the following:—

"The horse belonged to the Royal Artillery, at Woolwich, and was lame in the off fore leg, through which ultimately he became disabled to that degree that he with difficulty projected the limb even in walking. No cause whatever being discoverable, and the lameness continuing in defiance of all that had been done by way of remedy, it was deemed advisable to destroy the animal. The limb was dissected; but every part appeared healthy. His body was then opened, and, strange to say, a thorn of considerable length was found sticking in the substance of the liver.

"In the *Veterinarian* for 1847, p. 73, is related a case, by Mr W.



Smith, V.S., Epsom, in which the lameness appeared in the *near* instead of the off or right fore leg. The subject was a cart colt whom Mr Smith attended on account of a 'slight attack of fever,' with a little 'soreness of his sides.' He proved to be lame in the near fore leg, evidently in the shoulder from his action, but nothing could be discovered to account for the lameness. Nothing proving of any avail, and the lameness increasing, after four months he was destroyed. The limb, examined in every part after death, was found perfectly normal, as were the contents of the chest and abdomen, with the exception of the liver, which 'was diminished in bulk nearly one half, but much increased in density, and studded throughout with small cartilaginous bodies, which, from their shape, might be called asteroids, being full of points very much resembling stars. They were so hard, that I at first thought they were osseous, but succeeded after some time in deciding on their *cartilaginous* nature.'"

**ABSCESS IN THE LIVER.**—Newly purchased horses have not unfrequently been the subject of disputes owing to the presence of abscesses in the liver. These abscesses result in cases of hepatitis, or more frequently occur as secondary deposits of pus in strangles. Abscess in the liver is far more common in ruminants than in the horse, but interesting cases have been recorded of the malady in the last-named animal.

Veterinary surgeons are called upon to perform *post-mortem* examinations in such cases, and are required to assert if the disease is recent or chronic. It is important, then to ascertain the history of the case, and to determine if any signs of very acute disease have occurred whilst the animal has been in the hands of the vendee. If the hepatic abscess is large and covered by solid false membranes disposed in layers, forming a mass of great thickness, it is evident that the abscess is not a recent one, and may have been in existence for two or more months. If there are patches of chronic exudation on the surface of the liver, these favour the view that the malady is of old standing. A not uncommon complication in chronic liver disease is a concomitant enlargement of the spleen, and in the abscess succeeding strangles, suppuration may be found in the spleen as in the liver.

**DISEASES OF THE URINARY ORGANS.**—In various countries certain diseases of the urinary apparatus are regarded as redhibitory defects. Cases of dispute have occurred concerning horses that have been termed kidney-droppers but, although these have been regarded as injuries of the kidneys, they are in reality spinal affections, to be elsewhere considered.

**HÆMATURIA.**—There are singular forms of relapsing hæmaturia. They occur chiefly in carriage horses, and owe their origin to a violent strain and lesion of one of the kidneys. The lesion heals imperfectly, and whenever the animal is overworked, or made to exert itself in a sudden manner, symptoms of renal irritation supervene, and blood is discharged with the urine.



Such an animal is evidently unsound; but in order to fix the date when the unsoundness arose, it is important to learn as much as possible of the horse's history.

NEPHRITIS.—*Inflammation of the Kidneys*.—It has been asked in a court of law what length of time was required for the development of inflammation of the kidneys, and disorganization of these organs. There are acute and chronic forms of disease, but in the latter case the symptoms are sufficiently marked so as not to leave any doubt that the animal has been ill for a considerable period of time. Inflammation and suppuration of the kidneys may end in death in a week or ten days, and if the suppuration is connected with a pyœmic state, death may occur in a far shorter time.

As veterinary surgeons advance in the art of diagnosis they will be more careful than they have been as to changes in the urine and the occurrence of albuminuria. The very first case of the latter disease, reported by Mr Markham in the *Veterinarian* for 1842, is a good illustration of the forms of relapsing kidney disease which may give rise to disputes.

Mr Markham says:—"I hereby send you a rather curious case of a horse voiding albuminous urine, this being the fourth time, at intervals of from five to six months, that he has had similar attacks, and each attack being more severe than its predecessor.

"Oct. 23rd.—I was sent for in great haste to Mr Tompson's, of Bromly Hurst, the owner being afraid that the horse would be dead before I could get to him. Mr Tompson told me that he heard the horse come into the stable-yard, in the middle of the night, from the others that were in a field close by; and when they got up in the morning they found him in great agonies, and rolling about in the stable-yard.

"When I arrived he was a little easier, having staled, and nearly half a pound of the urine was hanging from the penis, thicker than calf's-foot jelly. The pulse was a little accelerated.

"Venesection was had recourse to, and about seven quarts of blood taken from him. A strong cathartic was then administered.

"He did not flinch from pressure on the loins; but, on examination of the renal arteries per rectum, I found them throbbing very much. I could feel more difference in the pulsations of the renal arteries in this horse, and another one that stood beside him, than ever I felt in a horse's leg that was very much inflamed.

"I make these observations on account of seeing, in Mr Percivall's 'Hippopathology,' that some of the members of the medical profession do not consider that a person making albuminous urine must, of necessity, have organic disease of the kidney.

"I am of opinion that this horse—twelve years old—has a chronic disease of the kidney, which now and then assumes an acute form, at which time the urine is so thick that the horse cannot void it, which causes those colicky pains; for as soon as he has voided his urine he appears much easier.



“ After venesection, and the operation of a cathartic, followed up for three or four successive days with antimonial alteratives, he appeared and worked as well as any of the other horses, and voided his urine with perfect ease. I boiled the urine that was hanging from the penis, and it coagulated similarly to the white of an egg, but was rather darker coloured.”

Albumen may appear in the urine in various diseases of the system, as well as in organic disorders of the kidneys, so that its demonstration in the urine does not necessarily indicate the existence of even incurable forms of unsoundness.

**RETENTION OF URINE.**—Difficulty in voiding urine is a troublesome condition for which horses have not unfrequently to be examined. It is but a symptom of various diseases, and very commonly we are told that animals suffer from inability to discharge their urine when in reality they are liable to relapsing forms of colic. True retention of urine occurs, however, under the following circumstances:—

*1stly*,—In cases of urinary calculi, the symptoms may be very severe at intervals, and the animals die, if calculi become impacted, as they sometimes do, in the ureters or urethra.

*2dly*,—In cases of paralysis, whether due to cerebral tumours, dropsy of the spine, or sprain of the back and loins.

*3dly*,—I have seen one case of disease of the prostate gland in a valuable carriage horse which I was called upon to examine as to soundness. and in which retention of urine had been observed.

Retention of urine may therefore be a valuable symptom of mysterious forms of unsoundness, and in itself is a sufficient evidence of the animal not being in such a condition as to admit of its being warranted sound.

**URINARY CALCULI** have often been associated with symptoms of relapsing colic, and animals affected with them have been repeatedly sold by horse-copers, who carefully avoid warranting horses.

It appears to me, that in all cases in which animals are sold by auction, or otherwise, which cannot from their appearance indicate at the time of sale the existence of internal disease, likely at any time to prove fatal, and which disease is known to exist by the vendor, a fraud is practised, which should be punishable as such. I have had several cases of this description under observation, and I cannot conceive that a man should be allowed to sell a horse with heart disease, chronic cerebral affections, or other internal disorder, which he knows must kill the animal soon. If, in such cases, the condition of the horse prevented a good price being obtained, it would be useless alluding to the matter, but I have known very profitable exchanges made, and considerable sums of money paid for the most mysterious screws which pass through the hands of horse copers from town to town, and fair to fair, victimizing a large number of persons. Amongst the mysterious screws, a certain number are affected with chronic renal disease.

**DISEASES OF THE ORGANS OF RESPIRATION.**—My readers will



readily admit that the subjects hitherto considered in these articles on soundness, have been rather out of the common order. The defects for which animals are chiefly rejected, are those implicating *wind* and *limb*. A horse with healthy respiratory organs is said to be "sound in his wind," and the principal diseases of the organs which unfit an animal for work are, *coughs*, *roaring*, *broken wind*, and *thick wind*. These are, however, not the only conditions which lead to disputes, and horsemen have a great dread of nasal discharges, chronic inflammations of the lungs, abscesses of the lungs, &c. On the subject of chronic nasal discharge, I have spoken in the third article under the head Glanders and Farcy, and I shall proceed at once to speak about coughs.

COUGH is but a symptom of various morbid states of the lungs and air-passages. If the diseases are acute and curable, the cough is termed *temporary*; but, if incurable, it is evidently a cause of permanent unsoundness. It is possible from the character of the cough to determine if it be acute or chronic.

An acute cough is usually a loud, sharp cough, indicating that the animal has not difficulty in forcibly expelling air from its lungs. A good test of soundness is to make a horse cough, and this is accomplished by pressing with the thumb and finger on either side of the throat. This induces irritation, a choking sensation, and the animal coughs. In examining a horse, especially one in good condition, attention should be paid to the animal's power in clearing its lungs after a smart trot or gallop. The experienced trainer knows that a good-winded horse snorts, and apparently clears his bronchial tubes by an expulsive effort very soon after having been pulled up. If the animal is a bad-winded one, we find that several minutes elapse before it can make a vigorous effort of this description. There is a great difference as to whether an animal is in good condition or otherwise, but the practical horseman soon determines what depends on a state of obesity or weakness, and what depends on actual disease.

If the acute cough is connected with bronchitis or pneumonia, there are the severe and unmistakeable symptoms of these disorders. It is said to be a painful or hacking cough, when, from the inflamed condition of the lungs or air-passages, the effort is restrained.

There are various forms of chronic cough. The most mysterious form is apt to occur in young horses after attacks of sore throat, and is noticed whenever the animal is brought out from the stable, or whilst eating dry food or after drinking cold water. Such a cough is usually noticed when an animal is exerted, but it may not be observed by a veterinary surgeon in examining a horse for soundness. It is essentially a disease concerning which some experience must be had.

In my work on the Domestic Animals in Health and Disease, I have spoken of this subject as follows:—

What is a chronic cough? is a question of some importance to horsemen, and one which is not very easily answered. When a man coughs beyond the limited period usually assigned to a common



cold, he is in fear that it has "settled on his chest," and, perhaps, that he may be consumptive, or attacked with the chronic bronchitis so common on our east coast, and so deadly amongst old people. But the horse is not subject to consumption, and the instances of *bonâ fide* chronic bronchitis are rare. There are several kinds of chronic coughs in horses. One is called a hollow cough, due to lung derangement, and another is characteristic of broken wind; a third is a short cough whilst feeding on dry oats, or after drinking cold water. This is often the roarer's cough, due to derangement of the nerves of the throat. The chronic cough is not usually characterised by any special feature which will enable an experienced man to say that it is chronic. I do not, of course, allude to the cough of a broken-winded horse, but to a short sharp bark which may be heard occasionally in the stable, always when the horse is first brought out into the cold air, and usually when any dry and solid object is swallowed. The only sure test of the existence of such a cough is time, and it is of considerable moment that purchasers of horses should know this, as they are very frequently offered horses with colds, throats blistered, "a little out of sorts from the sea passage across the Irish Channel," and with the assurance that the symptoms will all disappear in a day or two. I have known such horses bought, taken home, treated, and dead within a short time, proving the disease to be acute and severe enough, and quite sufficient to impress upon the mind of the purchaser a lesson of caution. In other instances, the cough does not disappear, and there is then endless dispute, where all chances of difference of opinion should have been avoided long before.

Were I to attempt a definition of a chronic cough, I could not say more than that a cough is chronic when the period has elapsed during which a chance of its cure exists. This is vague enough; but there are cases of relapsing sore throat, of slight irritation of the larynx, which persist, and are, after a time, cured, or which disappear when the animal is got, by good management, into robust condition. The disappearance of the cough is an indication that it cannot constitute a permanent cause of unsoundness. On the other hand, if all means have been adopted to control the cough and to cure it, and a newly-bought horse continues to cough for two or three months, it is not expedient for a purchaser to risk the issue; and if the conditions of the purchase admit of it, the animal should be returned.



*Glanders and Farcy in the Human Subject.*

From time to time cases of glanders or farcy are reported as occurring in the human subject, but the frequency with which such reports meet the public eye bear no relation to the actual number of cases which are observed. As with several other forms of disease due to animal poisons, there are many cases overlooked and never diagnosed. We have a law referring to glandered horses, to their use and sale, but we can state from experience that the law is evaded. Veterinary surgeons are not disposed to insist on the immediate slaughter of any glandered horse they meet with in practice. Cases of farcy are often much neglected, and the result is the spread of disease. Information has reached us of glandered horses sold by public auction, of animals similarly affected being worked in London omnibuses, and it is well-known that glanders has proved unusually destructive within the last two or three years amongst the horses of our cavalry regiments.

Ireland is no doubt the division of the United Kingdom in which there are most cases of glanders in man and horses. In the Report of the Census Commissioners for 1851, we find the following remarks: "The number of deaths from this cause afforded by the returns of 1841 was but 11; on the present occasion they amount to 196—viz., 168 males, and 28 females. We think the magnitude in the returns for 1851 is owing not merely to a greater knowledge, both medical and popular, of the symptoms of the disease, but to an increase of these affections, and to a greater negligence on the part of persons engaged in the care of horses. Instances have been recorded of families becoming infected with this frightful and fatal malady, from residing in the same apartments with diseased animals. In our Report upon the statics of disease we have already called attention to the subject of the increase of this affection, and pointed out the necessity which exists for bringing infected animals under the surveillance of the police.

"Compared with the deaths from all causes, the deaths from these affections appear to be 1 in 6·944, and in those from all specified causes 1 in 6·251. By localities, these deaths were in the rural districts 130, in the civic 15, in hospitals 41, and in workhouses 10. The year in which most deaths from this cause occurred was 1848. The seasons show the following great varieties: in spring there died 71 persons from this cause; in summer, 50; in winter, 48; and in autumn but 27. Provincial proportions respecting this disease would be inapplicable, inasmuch as in but two localities in Munster, viz., the county Clare and the North Riding of Tipperary—were any deaths from this cause returned. The localities from which the greatest number of deaths was returned were Galway, Tyrone, Donegal, and Armagh counties. Two deaths from this disease under 12 months of age were returned; but the principal ages under which these deaths



were returned to us were from 15 to 25, from 30 to 40, and from 50 to 55."

The census for 1861 has not yet reached us; but we anticipate no less startling revelations than in the report already quoted, inasmuch as, with the return of troops from the Crimea, not a few animals were shot as glandered, and outbreaks have been rather frequent since. It is certain that glanders is far more rare in England and Scotland than Ireland. The Registrar-General's reports are silent on the subject in North Britain; and in England we find only one case of death from glanders reported in 1858, 3 in 1859, and 4 in 1860. The disease appears therefore to have been on the increase. We have no statistics on the subject for 1861 and 1862; but it is likely that if more attention were paid to the subject, we should hear of many more cases than are noticed at present. Indeed, in most of the official reports, the disease glanders is not noticed; and it is said that they are included with other diseases under the general head erysipelas. Why this should be we cannot understand. It appears to arise from a desire not to multiply the headings under which deaths are tabulated, so as to keep the tables of a uniform and moderate size; but we think that such maladies as malignant pustule and glanders should be specially noticed. It is only within five and thirty years that such a malady as glanders has been recognised in man. Schilling, an army surgeon in Berlin, reported the first case in 1821. Several papers on the subject were published shortly afterwards, and amongst the most remarkable were those by Travers and Elliotson. Rayer published a most elaborate memoir on glanders and farcy in 1837.

There is no doubt whatever that a considerable number of cases of glanders and farcy are of spontaneous origin in the horse. Whenever animals are kept in damp, ill-ventilated stables, and are not carefully attended to, chronic catarrhs, which soon become complicated by ulceration of the schneiderian membranes, enlarged lymphatic glands and abscess in the lungs, are very common. Glanders has been in all countries a disease common amongst cavalry horses. Its origin is unquestionably favoured by overcrowding, but the most potent cause in inducing its spread is contagion. This fact should induce us to be much more vigilant than we are as to the appearance and prevention of cases of glanders. The best preventive is the early destruction of every infected animal.

The subjoined cases afford substantial proof of the importance of this subject:—

#### CASE OF GLANDERS—DEATH ON TWENTY-SEVENTH DAY—AUTOPSY.

(Under the care of Mr SKEY. Reported by Mr HOWARD MARSH.)

J. H., aged 24, after being out of work for three months, engaged himself to a horse-slaughterer on June 14. On the following day he thrust a rusty nail into the tip of the left forefinger, and, thinking the accident of no consequence, continued his employment. By the next day the finger had become inflamed and very painful,



and he observed red streaks running up the forearm. At the end of a fortnight, having in the interval suffered a very severe attack of inflammation of the finger, accompanied by much general fever, he was advised by the Surgeon under whose care he had placed himself to come to the Hospital. He was at once admitted on June 29. On examination, it was found that his health was in a very bad state, and his expression indicated severe suffering and distress. Almost all the soft tissues of the finger had sloughed, and the whole hand was much inflamed and swollen. The lymphatics on the radial side of the forearm had suppurated, but the axillary glands were scarcely at all enlarged. He stated that he was a butcher, but did not mention anything which pointed to his real condition till several days later. Incisions were made for the escape of matter, and he was ordered good diet and quinine, and a charcoal poultice to the fingers. From this date he appeared steadily to improve, both as to the local mischief and the general health, till July 4, when symptoms of severe constitutional disturbance occurred, and a patch of dusky-looking erysipelatous inflammation appeared on the forehead, involving the right eyelid.

On the 5th, the forehead was sprinkled with small bullæ, containing a dirty-looking, dark-coloured fluid, and the scalp and face were oedematous. He had slept little during the night, on account of severe pain in the head; the skin was clammy and relaxed; the pulse 120, and very feeble. He was ordered three grains of quinine every three hours, and ten ounces of brandy daily, with sufficient opium to procure sleep.

On the 6th, he was decidedly worse. The erysipelas had extended over the greater part of the scalp, and the face and throat were much swollen. A free incision was made into the integuments of the forehead, and a small quantity of ill-formed, fetid pus drained out from the subcutaneous tissue in which it was infiltrated.

On the 7th, the whole of the integuments over the frontal bone were beginning to slough, and he was very weak and exhausted.

On the 8th, the anterior half of the scalp was sloughing rapidly. Several pustules, about as big as those met with in small-pox, had appeared on the chest and right arm. They were seated on a dusky, inflamed base, and contained an opaque, brownish-coloured fluid.

On the 9th, the anterior half of the scalp was converted into one large slough. The chest and extremities were covered with a crop of pustules similar to those described above, and there was an inflamed, cord-like condition of the lymphatics of the left foot and leg. From this date he grew rapidly worse, and died in a comatose condition on the 12th—that is, on the twenty-seventh day after the reception of the poison into the system; the erysipelas having commenced on the twentieth day, and the pustular eruption three days later. There was no discharge from the nose during his illness.

*Examination of the body Fifteen Hours after Death, from the*



*Notes of Dr Andrew.*—Post-mortem rigidity slight. Over the left tibia inferiorly a small, firm, subcutaneous swelling, over which the integument was ulcerated. Numerous shot-like pustules, none of them presenting any central depression, scattered over the neck, trunk, and extremities; most abundant on the upper arms. Integuments of forehead and anterior half of scalp sloughing; bones not exposed; great œdema of eyelids; conjunctivæ seemingly natural. No change detected in any of the salivary glands. Lymphatic glands in neck slightly enlarged. Submucous glands at base of tongue slightly enlarged, but not unusually so. Pharynx and œsophagus natural. Larynx: two small pustules, the size of peas, one at the level of the cricoid cartilage, the other immediately below the right vocal cord. Pericardium contained about an ounce of serous fluid; no ecchymoses on any part of the membrane. Heart: right cavities contained two small fibrinous clots; one or two smaller ones on the left side. Blood in large veins fluid; valves normal; muscular substance pale and soft; no petechiæ on the endocardium, but it was slightly blood-stained. Lungs: on the surface were one or two small petechial spots. In the substance of the lung were numerous small, firm, dark red masses, seemingly consisting of coagulated blood, with yellow points in their centres. One or two small purulent deposits were also detected generally near the surface. Lungs emphysematous throughout; contained no tubercle. Supra-renal capsules seemingly natural. Liver: 5 lbs. avoirdupois; on section, pale and very soft, its consistence being scarcely greater than that of a lung in a state of grey hepatitis. Gall-bladder contained a very little yellow bile. Kidneys large and congested. Lumbar, axillary, and inguinal glands seemingly unaffected. The nasal fossæ were not laid open, but no evidence of any discharge having taken place, or of any change in the mucous membrane, could be detected by an external examination; and the upper surface of the soft palate, which was removed together with the tonsils, uvula, &c., was perfectly natural.

CASE OF FARCY—TREATMENT BY LARGE DOSES OF THE IODIDE OF POTASSIUM—RECOVERY.

(Under the care of Mr SAVORY. Reported by Mr HOWARD MARSH.)

C. H., aged 52, came to the Surgeon's consulting-room on August 28, 1862, giving the following history of himself:—He had been in easy circumstances, as a gentleman's servant, till January, when, being out of employment, he took to the care of a stable and to driving a cab. The stable was known to have been infected with glanders poison for a twelvemonth previously, and six or seven horses had suffered from the disease. He remained well till the end of May, at which time, after feeling very languid and depressed for some few days, he noticed that the left side of his nose was red, swollen, and painful; and on the mucous membrane of the nostril he found



six or seven small, red, and very sensitive pimples. A copious, thick, yellow, and very fetid discharge began to flow from the nose, and a quantity was spat from the back and upper part of the pharynx. The glands under the jaw were enlarged, and he had "kernels along his jugular;" the throat was sore, and deglutition was painful. About a fortnight later, seven or eight "buds" as big as a four-penny-bit, and about twelve smaller ones, appeared on the left side of the neck and the left arm. These suppurated, and, after a time, healed, being succeeded by others which, in their turn, also healed, and gave place to fresh eruptions of similar pustules. The glands in the axilla were enlarged, but the lymphatic trunks seemed unaffected. He now became much emaciated, and so feeble that he could scarcely walk, and not being able to obtain proper food and good lodgings, fell into the deepest distress.

When he came to the Hospital, the "buds" had ceased to break out; the discharge from both the eye and nose was very abundant, thick, yellow, and fetid. The eye was considerably protruded, and the conjunctiva slightly chemosed. The glands under the jaw and along the side of the neck were still enlarged. He was much emaciated and exceedingly weak. He was ordered to be kept in a room by himself; to take two grains of quinine three times a-day, and two pints of porter, with good meat diet.

August 30.—Seemed more feeble than when admitted. To take a teaspoonful of bark with the quinine, and four ounces of brandy.

31st.—To take two teaspoonfuls of bark, instead of one, with the quinine.

September 8.—Appeared getting worse: the discharge was very copious, and the eye was more prominent than when he was taken in. Ordered two teaspoonfuls of bark with seven grains of iodide of potassium three times a-day.

26th.—Was certainly improving under the iodide. Had gained strength and was more cheerful, and could take his food better. Discharge about as before. To take ten grains of the iodide instead of seven.

October 12.—Was very much better. The eye was less prominent, and the discharge both from it and the nose was decreasing. He was gaining flesh, and was able to sit up. To take twelve grains of the iodide three times a-day.

20th.—Was now able to walk about, and expressed himself as nearly well again; general condition good; the discharge though much decreased had not ceased, and the eye was still more prominent than natural. To take fifteen grains of the iodide three times a-day.

He was discharged on November 17, at which date, although the secretion from the nose was excessive, it had ceased to be fetid, and the eye had receded into its natural position.

When seen on February 7 he was in good health, and considered that he had entirely got rid of the disease.



*The Prevention and Treatment of Murrain:* Being an Address delivered at a Meeting of the Kelso Farmers' Club. By WM. ROBERTSON, M.R.C.V.S., Kelso.

MR CHAIRMAN AND GENTLEMEN,—The interest attaching to the consideration of murrain is considerably increased this season as compared with many that have preceded it. It has been more extensively distributed, and also more virulent in its development. We can easily understand the alarm with which, more than twenty years since, our agriculturists met the first well-recognised outbreak of this troublesome and then ill-understood malady; it was nothing more than was to be expected. From the eastern shores of the island the disease spread with unexampled rapidity; the loss sustained by the holders of stock was considerable, not only from the deteriorated condition of the animals affected, but also from the large per-centage of deaths, which, at that time, were not uncommon. This was, no doubt, in part from the more virulent form which at that time characterised the malady, but very much, we are inclined to believe, from the erroneous ideas entertained as to its nature and consequent treatment. *Murrain, vesicular epizootic, epizootic aphtha*, foot-and-mouth disease, by all which terms it is well known and easily recognised, is an eruptive febrile affection, and may not inappropriately be classed amongst the exanthemata. These, amongst the lower animals, as well as in man, are characterised by certain distinct class features, and, comparatively, marked by much similarity. These diseases are generally found affecting animals once in a lifetime, after which, even when exposed to special contaminating influences, they are not so liable to be thereby acted upon as others: we say not so liable, as there are many well-authenticated cases where not only variola in man, but also this vesicular epizootic have appeared in the same individual oftener than once. They run certain ascertained courses, having certain and definite stages in their development, they are fatal more as attacking internal organs, or associated with internal disease; they are dangerous if arrested in their development; they are all eminently contagious. The symptoms attending the development of murrain are well marked, and such that every one considers himself competent to pronounce upon. There is, first of all, more or less symptoms of general fever, indicated by the animal temperature being alternately increased and diminished, disinclination to feed, or rather capricious appetite, separation, if in company, from the rest of its fellows, &c. Consecutive with this fever we have an eruption, vesicular in its nature, occurring in those parts of the skin most vascular, between the digits, on the udder inside the thighs, on the dental pad, and along the sides and surface of the tongue and buccal membrane, all these situations are extremely vascular, although possessing a thick cuticle. The mouth and feet, most invariable as they seem, are most probably the vehicles by which the virus is distributed. Occa-



sionally this eruption extends from the mouth into the œsophagus, stomach, and intestinal canal. As the effect of this eruption, we have a profuse discharge of frothy saliva, occasionally mingled with blood, from the rupture of vesicles and abrasion of the exposed surface; there is much difficulty in feeding or mastication, and rumination may be entirely arrested according to the extent the mouth and tongue are involved. This is generally most marked when the vesicles have burst or been rubbed off, and an extensive raw surface is exposed. Lameness is early present, and, in severe cases, persistent, the state of the feet frequently tending more to prevent recovery than aught else. The vesicles present themselves between the digits, and especially at the posterior part of the coronary substance, that is, at the upper and back part of the hoof, while, in the second stages, the hoof here begins to loose its attachments to the parts beneath, and not unfrequently is removed altogether, always an undesirable termination, while, in some neglected cases, not the hoof only, but the bones contained, may part connection with their fellows, and we have the awkward predicament of the animal progressing on its stump. The vesicles generally disappear in a week or ten days, occasionally they slightly suppurate. Although the eruptions may thus early terminate, the fever may continue. It is in such circumstances that those cases of tardy recovery or fatal termination occur. In milking animals, the inflammation in the teats and udder may be so severe as to terminate in suppuration, ending in partial or complete destruction of the glands, or irritative fever may cut the animal off. It is this tendency to structural alteration in the udder which we have most to dread in cows giving milk when affected with murrain. The joints of the extremities are also situations where the disease is apt to locate itself in this latter stage, or it may be some internal organ—most probably the lungs. In either case fatal results may follow. This description of the malady applies to nearly all our domestic animals, as, with the exception of the horse, dog, and cat, all seem predisposed to its attacks. The symptoms exhibited by one class may, with slight modification, be taken as the symptoms shown by any or all classes, while of the whole, probably the pig suffers most; and it is most fatal amongst young animals.

I am not prepared at this time to trace the extraordinary outbreak of murrain this season to more than ordinary importation of cattle in this condition, but in many of the like manifestations of that other epizootic, pleuro-pneumonia, this is most satisfactorily accomplished. Out of many we will only notice one. About four years since, the country, as a general rule, was suffering in a minimum degree from this disease, when it may be remembered that a large number of Dutch cattle appeared in our markets. These, from their small prices, were readily bought up, but what was the consequence? Pleuro-pneumonia, from being in abeyance, speedily reached its maximum over the whole island. Many individual instances could be adduced, where, without a shadow of doubt, the appearance of the disease was



directly traceable to the introduction of these animals. Such, however, I think it needless. We are not desirous to enter on any discussion as to the political correctness or fatuity of the principle involved in the system of free-trade, as a whole, but what I maintain is, that it is not fair that our flocks and herds, representing nearly two hundred million sterling, should be thus wantonly exposed to the most fatal diseases—that the very offscouring of the stocks of Central Europe be poured ruthlessly into our ports, sowing disease broadcast over the country. It is not fair either to producer or consumer, for I am prepared to demonstrate that neither have been benefitted, both have been injured. The former is ever and anon subject to harassing fears or serious pecuniary losses from the presence of some destructive epizootic amongst his stock; the latter is paying an exorbitant price for an article with us of absolute necessity, as I do not see any prospect of us becoming nationally vegetarians, with every probability of both these results increasing. Depend upon it that as a question of political economy, in some shape it must yet, it may be soon, force itself on the consideration of the Legislature, for upon its solution, in a great measure depends, the solving of that other problem, how are we to supply food for a steadily increasing population? And, gentlemen, there is involved in this question of the prevention of disease another of no less importance connected with the health of our population as it has yet to be solved, the connection that exists between the disease of our population and the consumption of diseased or deteriorated animal food.

As to the treatment of this disease, we are aware that a very general impression exists that nothing can be done for the animals—that it is best to leave them alone. Now, from all I have experienced, I am convinced that very much can be accomplished in this direction. When afflicted, if the animals are in the field, it would be better not to leave them there unless the weather is mild and the cases not severe. However, it is not uncommon that the number of cases occurring at the same period precludes the possibility of such housing being accomplished; as the next best thing, attention ought to be bestowed in placing them in good shelter, and as dry a situation as possible. When under shelter, the litter had better be scant and clean than too abundant and wet. Whether within cover or in the fields, a very considerable amount of good will always be accomplished by gargling their mouths at least once daily, for two or three days, with a solution of alum and water, salt and water, or a mixture of vinegar and water. In those cases where fever is considerable, it is advisable to administer a dose of laxative medicine, as half-a-pound of Epsom salts along with a pound of treacle in gruel; this may be repeated, if needful, in three or four days. The feet ought at this time to be attended to, as their condition materially affects the animal, since no animal can continue well under the exhaustive influence of constant pain. The best treatment for these is to have all dirt removed and washed, especially between the digits, with a solution of blue



vitriol in water; or what is probably better, smear them with an ointment composed of blue vitriol and lard, in the proportions of one to four. In a short time, when the hooves begin to separate, the loose portions ought to be removed with the knife, and the dressing continued, or tar ointment may be substituted. This simple and easily-applied treatment will, in the majority of instances, be found efficacious, the recovery seldom requiring more than ten or fourteen days. During this period, should the difficulty of masticating the ordinary food be considerable, a little bran mash may be substituted, and eaten with more ease. In those cases where the joints become involved, the recovery is more tedious, as well as uncertain; local applications, as cold water bandaging, followed by smart counter-irritation, will generally be found necessary. Other complications must be treated as they arise, and according to symptoms. We may safely assert that in all cases, with the exception of the very mildest forms, the loss to the owner is equal to fourteen days' keep, while in many it is certainly much more. Indeed, I am creditably informed that even in those instances where the animals have apparently recovered with the least trouble, that the slaughtering has been more unsatisfactory than appearances would warrant. Still we have met with many cases, where, following recovery, the animals have made flesh with increased rapidity—this, from the system being freed from an irritant—having received a check—reaction commensurate to this check is immediately established. Although murrain is thus troublesome when occurring amongst store or fat cattle, it is decidedly a more dangerous affection when attacking milk cows or sheep, and more especially ewes in a certain stage of gestation. Amongst the former it is the udder which should occupy our principal attention, as it is the glandular structure of this organ its most dangerous results are found to terminate. Irritative fever is generally higher, and the animals will, as a natural consequence, stand depletive measures with greater impunity. Amongst the latter, ewe stock, the most fatal period for the development of the disease may be said to be near the termination of gestation; when severe, we apprehend a number of cases of abortion, while the susceptible system of the ewe at this period predisposes her to fall a victim to internal disease in some of its many forms—the system is weakened and possessed by a constitutional virus. Whenever appearing amongst a sheep stock, most attention will require to be paid to the feet, the detached portions removed, and the whole dressed with the wash or ointment we have already noticed. Give them, if possible, a dry and clean lair, allow bran each day, to which may be added equal quantities of saltpetre and glauber salts. With regard to the prophylactic or preventive measures to be adopted in connection with murrain—believing, as we do, that murrain is much oftener caught than generated, that is, it is more frequently propagated by contagion than developed by any peculiarity in the animal system, it follows, as a necessary consequence, that the proper course indicated for its removal is prophylactic, not therapeutic—preventive, not curative.



The consideration of these measures very naturally resolve themselves into two classes of greater and less. The less, those which all may put in force for the benefit of themselves or neighbours. The greater, those which can only be enforced by extensive, intelligent, and vigorous combination, combined with governmental or executive assistance. To the first of these it is that our endeavours in the meantime must be entirely directed, as it is alone from these that we can reap immediate benefit. On the outbreak of murrain in any one stock, the system of isolation ought at once to be adopted and enforced with as much rigour as circumstances will admit. Not only must the affected animals have no direct connection with stock believed to be healthy, but the utmost care is needed that the virus be not distributed even indirectly. Individuals coming in direct contact with the matter of contagion ought to be particularly careful that this is not conveyed to sound animals through their medium. In the cases of cows giving milk, it is certainly advisable not to make use of this for the feeding of any animals, at least during the active stage of the disease; for although many instances may be adduced where this has been done with impunity, still there is sufficient evidence to prove that it cannot always be counted upon as an innocuous aliment. It is especially dangerous to young calves, pigs, and even children, not only as a fertile source of propagating the disease, but, moreover, of inducing a diseased condition of the alimentary canal and circulating fluid in all these young animals, not unfrequently attended with fatal results. The practice of modifying the disease by inoculating all the healthy stock that may be present on any farm at the outset of an attack, and thereby inducing the disease in a modified form or moderating any subsequent attack, has been employed largely in some of the German States, and in the Low Countries, and there, if we are to believe the authenticated reports, with marked benefit. However, as we have not personally witnessed the operation of this inoculation, we cannot here particularly recommend it as certain in its action, but would have much pleasure in practically experimenting on such, should any gentleman be kind enough to submit any stock to its operation. Stock ought not be placed on pastures where the diseased have rested or grazed for some considerable time, the period varying with the state of the weather. The complete eradication, or at least reduction to their minimum of extent and virulence, of this, as also of other more fatal contagious epizootics, will never be accomplished until the adoption of some extensive, intelligent, and vigorous preventive measures, having the sanction or assistance of the executive Government. This, Mr Chairman and gentlemen, is no hasty conclusion, but the result of mature consideration, resting upon the history of the origin and spread of contagious epizootics in our own country and the Continent for the last twelve years, as also from a careful study of the statistics of supply and demand in our principal meat markets for the same period. As long as any county, or portions of a county, have no admixture of stocks from importation, they are happily com-



paratively free from contagious epizootics. It is following the wake of the importation of stock that those diseases we have most to dread make their appearance. It is a notorious fact that stock of every description is at the present more subject to disease than before the establishment of the present cattle tariff, and disease not believed to be enzootic to Great Britain; it is by pluro-pneumonia that by far the largest per-centage of loss in cattle is sustained; in fact, the epizootics, pleuro-pneumonia, and murrain, may be said to furnish above half the number of cattle ailment. It is of very trifling moment, all endeavour, individual or local, that can be brought to bear on the prevention of one or other of these maladies, so long as a perfectly open channel exists for the conveyance of regular and periodic instalments of disease. It is supposed that there exists some system of inspection at our ports, but what does it amount to?—absolutely nothing. It has power, of course, to arrest animals absolutely labouring under disease, but is powerless in what constitutes a much worse class, those in which the disease no doubt exists, but has not unequivocally developed itself. From their contiguity with the absolutely diseased they have become contaminated; but, as every practical man knows, may not exhibit the characteristic symptoms for some time.

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*Milk Fever, Parturient Fever, or Dropping after Calving.* By J. G. DICKINSON, M.R.C.V.S.L., Boston, Lincolnshire.

THIS disease is very prevalent in Lincolnshire, and has committed great havoc in Boston and locality, causing ruin to many an honest small farmer, cottager, and cow-keeper. Shorthorns, good milkers, and animals in high condition, stuffed just about the time of calving, are the most exposed to its attacks. Heifers with the first calf are not so liable as cows that have had three or more calves, but generally speaking, the third time of parturition seems to be the most frequent. Viewing the cow to a certain extent as a mere milking machine to suit the wants of man and child, and taking into consideration the present style and mode of feeding, almost artificial, nature at times becomes overbalanced, and great nervous excitement must follow, too often the cause of death.

This disease generally occurs the next day, or in three or four days after. There are two distinct forms, one is simple paralysis of the hind extremities, the other consists of an effusion of blood upon the brain and spinal cord, and we may also have pure inflammation of the membranes of the womb and intestines, produced by exposure to cold, over-driving, but more particularly due to brutal injury often inflicted during the time of parturition, not to be at all wondered at when we are modestly told that it only took six or eight of us to pull the calf away. *Symptoms*: cow left apparently all right, anxious for food, but it is found that the milk will not



flow with the natural freedom, which to the experienced creates alarm, and is the cause of another visit. The cow is then found suddenly to have left off feeding, stares about, and gives a peculiar moan or groan, which will at once indicate the nature of the attack. The respiration hurried for a few minutes, this over, the animal appears to regain its consciousness and begins to feed. These premonitory symptoms may take place three or four times, but at length the cow drops, attempts to rise, and then remains quiet; or has the head thrust out or turned round to the shoulder, or raised quickly up or dashed violently down again. We generally have tympanitis to a great extent, the udder swollen, hard, and in the advanced and unfavourable stage the head dashed about, stertorous breathing, total insensibility to pain, at times to all appearance dead; constipation of the bowels, and the udder does not take on its function, the superabundance of blood soon produces congestion and inflammation of the brain and nervous centres. Such are the most prominent features of this disease. *Treatment*: in the first stage at once bleed, and that until a perceptible effect in the pulse is indicated. I believe this to be the sheet anchor; then follow with purgatives, but not violent, combined with stimulants, such as brandy, ammonia, &c., and these given with caution. Apply cold water to the head—ice, if you can obtain it—place wet rugs all over the body until you produce an artificial Turkish bath; a copious sweat will be found of great benefit, followed up with a stimulating embrocation down the spine. Apply friction to the legs, warm rugs after the wet ones are removed. Pay particular attention to the withdrawal of milk; turn the cow over every time you relieve her bag—say three or four times a-day—use enemata, and draw off the urine if required. While looking at the patent milking-machine, I thought it would be of great use in all cases of retention of milk. See that the cow is carefully propped up with clean straw, so that the dung and urine may not create mischief. Cleanliness never ought to be lost sight of even in the cow. Remove the gas if tympanitis has taken place by the flexible probang if in the early stage of the disease; while if in the latter, puncture the paunch, and leave the canula in—in fact, do all in your power to ameliorate the condition of your sufferer. A great deal of mischief is often done by the too frequent administration of stimulants. It must be adding fuel to fire—that is, if we consider it to be apoplexy. I have tried many agents in this disease, and at once discarded bleeding, depended upon powerful stimulants, then gave trial of aconite, belladonna, and strychnia, but find from experience bleeding, purgatives, with judicious stimulants, to have been the most successful remedies.

In the mild form of this disease, that of simple paralysis, we have but little danger, no necessity to bleed, add purgatives with stimulants, followed with salines and stomachics, and stimulate the spine if not soon up on their legs; not much food, so as to cause a flush



of milk. They generally get up in twenty-four hours. I have had cases where they have been down seven days, and jump up all of a sudden, especially if some neighbouring quack happens to be so fortunate as to inflict a wound in the tail for the supposed tail-worm, the great pain causing exertion. That milk fever is sometimes epidemic there is every reason to suppose. The veterinary surgeon may be long without a case, then in a short time have many in town or country. In 1860, at Horncastle, nearly every cow that calved had the disease, and in most cases it proved fatal. That there is also a constitutional tendency in this complaint cannot be denied. Animals that have been the subject of this attack once are very liable to it again. I have had occasion to notice one case particularly, that of a splendid bred cow, the property of C. Sime of Fishloft, which had the disease after two successive parturitions, and, strange to say, with twin calves both times. Many more cases I could enumerate. There are some agriculturists that believe it is hereditary, the purer the breed the more disposed to any disease.

Preventative means are but few. Care should be taken at the time of calving that high condition should be avoided. Instead of a fine fresh pasture, that of a very short bite—in fact, let them work hard for their living, and if we have secretion of milk in the udders before calving, then by all means imitate the calf, remove the milk from the mamma; for if nature ordain it requisite afterwards for the maintenance of the calf, why not assist nature before? View the udder as a mere receptacle for the milk.

I have been called in previous to calving to cows quite fat, where there have been evident signs of cerebral disturbance shown by the short respiratory action, staring eye, and with the cow resting her head on any projecting object. I would advise in these cases the abstraction of blood—say six quarts—and give a purgative, followed with salines, and small quantities of food, paying strict attention to the milking. A case of this description came under my notice in a cow belonging to C. Sharp, Esq. of Townshead Villa, which has fully proved the course of this treatment to be admissible. Cows that in general suffer much in calving are not so liable to milk fever, and those that calve with the least trouble are the most prone to it.

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*Treatment of Colic, &c.* By THOMAS GREAVES, Veterinary Surgeon, Manchester.

I FEEL an irresistible inclination impelling me to make a few remarks upon this very interesting and important subject, which has been so ably handled by Mr Joseph Gamgee, sen., in the September number of the *Edinburgh Veterinary Review*, and now again in this February number, in reply to "Argus" in the January number of the *Veterinarian*. It is a subject I have always taken a very lively interest in;



it formed the subject of an Essay of mine read before the Veterinary Medical Association, London, January 26th, 1841. I may say for more than 28 years I have daily bestowed much attention to this kind of cases, and only last week I had one of more than ordinary interest under my treatment—in fact, it was this case that finally decided me to make the following comments.

A cart-horse, five years old, was brought to me on Sunday morning week, and said to have been in pain the whole of the preceding night; the pains were not very severe, but were dull and obstinate; pulse was but very little disturbed; he had an ordinary gripe drink administered to him, and that apparently gave relief, but after a few hours the pains returned. Another drink and an enema relieved him 18 hours, when he became in pain again; he had another drink increased in strength, another clyster, and his abdomen was well stimulated with mustard; the pains not subsiding, he was bled freely eight quarts, and had a physic ball 6 drachms B. aloes given to him; the pains continued about all by one at no time very severe, for 144 hours, when death put an end to his sufferings. During this time he had had his abdomen frequently stimulated with mustard liniment, increased in its potency by adding to it spt. of turpentine and liq. ammonia fortis, and at times fomented with a horse-cloth wrung out of half-boiling water every ten minutes for two hours at a time; he had very frequent enemas of warm water and also tobacco smoke frequently and plentifully injected by Read's pump. In the way of medicine, he had had B. aloes 6 drachms, croton farina 3ij., calomel 3iv., linseed oil 5 quarts, powdered opium 3iv., tincture opium 10 oz., tincture of pimento 10 oz., spt. nitrous ether 10 oz., liq. ammonia fortis 2 oz., &c., &c., and allowed to drink one quart of water every one or two hours; he partook of no food during the whole time; his bowels never responded; there was no perceptible tympanitis. I occasionally examined him per rectum, to satisfy myself as to the state of the bladder, and I could distinctly feel a large mass of ingesta beyond my reach; the horse urinated occasionally and naturally.

During the time he was held, I had another case of colic came in, whose paroxysms of agony for 5 or 6 hours were twenty times more severe than was the above case at any time during his illness, but these pains intensified as they were entirely succumbed to two gripe drinks, bleeding, mustard applications, hot fomentations, and clysters.

*Remarks on Treatment.—Medicine.*—Mr Gamgee gives Cape or Socrotrine aloes; "Argus" gives oil, tinc. opii, and spt. ether sulph. I admire Mr Gamgee's candour, and am much pleased with the confidence he expresses in aloes as an antispasmodic. I would not say one word to weaken that expression of confidence, but I must frankly confess, that I am not near to the same extent as successful as Mr Gamgee is when he says "he has not lost a single horse by colic or other acute intestinal affection during 32 years, where his instructions have been properly attended to;" but if we mean to keep pace with



the times, and wish to progress with the spirit of the age, we dare not fly in the face of facts. He places his dependence upon aloes; I place my dependence upon liq. ammonia fortis, in half-drachm doses, given in a pint of warm ale or warm water. If my case is a protracted one, I increase my dose to one drachm, always being very particular in measuring it and shaking well up whilst giving it. I believe its action is electrical, and that it is the finest antispasmodic we possess.

*Clysters.*—I possess one of Mr Gamgee's enema funnel tubes, and have much pleasure in bearing this, my testimony, to its simplicity and great utility; it can accomplish everything any other clyster instrument can do. I fully coincide with him, that large quantities are very objectionable, and also that force is injurious; I would rather pass the injection gently in, just as the rectum and anus are retracting, it appears to be sucked in, and I believe it can pass the whole length of the rectum, but I also hold in very high esteem the tobacco smoke by means of Read's pump.

*External applications.*—I differ from Mr Gamgee on this point of treatment; I am quite satisfied of the great benefit often resulting from mustard applications in abdominal pains, and I have the very highest opinion of hot fomentations.

*Bleeding.*—It is the custom in this part of the country to bleed in colic and enteritis. Although I am myself averse to blood-letting in my general practice, I always have recourse to that operation in colic, when I find that other treatment fails to give relief.

*Concluding remarks.*—I particularly wish to call attention to two points of consideration in the case I have described above: the one is the length of time he was held, and, secondly, the cause of death; with sundry suggestions I am about to make to meet such cases. The *post-mortem* examination disclosed these facts, viz., inflammation, but not of a severe character, in portions of the small bowels, the contents of the stomach, small and large bowels, all in a semi-fluid state, large quantities of it, but just as the colon terminates into the rectum there was a large mass of unsoftened, impacted feculent ingesta, more than a large bucketful, forming a complete obstruction; there was also considerable disease in the liver, probably of an old standing. Now the point I am anxious to call attention to, is the situation where the stoppage was; the rectum was perfectly empty, and if any means could have been had recourse to to extract this mass, or to inject a fluid into it to soften it, this horse's life could have been saved. Now it will be borne in mind, that all physiologists concur in the opinion, that little or no secretion takes place in the colon; and my experience has proved to me, in numbers of *post-mortem* examinations, that obstructions in this part are frequent causes of death. Now it has often occurred to me, and I feel fully persuaded, that an instrument could be produced to overcome this difficulty, the want of such an instrument never stood out more forcibly before me than in this case. There was I, and there was my case lingering on and on, day after day, dying before my eyes, but giving me ample time to think and think again for six whole days and nights, and I wholly unable to save him.



I can see by my mind's eye a number of instruments differently contrived, each of which I believe could be made to accomplish this purpose. When I see Dr Nellaton, that eminent and ingenious French surgeon, of European reputation, contrive that beautiful and delicate instrument to ascertain whether it was lead or bone that existed at the end of that deep dark sinous in General Garibaldi's wounded ankle, I say, surely Englishmen, if they will only put their wits to work, could contrive to make this instrument, whose usefulness would have infinitely greater scope, be of more vital importance, and its value in practice incalculable. But perhaps some of my readers are ready to exclaim, "Ay, this writer is one of those wild enthusiasts, a day dreamer, a visionary theorist, who has got hold of an impracticable notion." But such a one I would ask, Have you ever in your life given ten minutes' deep, serious, earnest consideration to the matter? I would ask, Do you know that the entrance into the colon is only 22 inches from the anus in a straight line through the interior of the rectum in an ordinary-sized horse, and that an ordinary-sized man's arm and hand can reach 32 inches.

*Feb. 6, 1863.*

[Mr Greaves adds but one more case to the list of unsuccessful ones under the ordinary system of treating colic. Mr Greaves recognises that it would be very desirable to get an instrument to remove obstructions in the colon, and that these obstructions are often within a short distance from the anus, and yet he extols ammonia as a *cure* for colic, and tells us that he gave four oz. of powdered opium, ten oz. of tincture of opium, ten of tincture of pimento; and to counteract the disease, as also to prevent the constipating effects of such remedies, he only gave six drachms of aloes. The four quarts of linseed oil, four drachms of calomel, and two drachms of croton farina, might or might not have any effect as purgatives. We find that the safest purgative for the horse, and, indeed, the only one to be relied on, is aloes; and that such obstructions as Mr Greaves had in his case always yield to a second dose at most, and enemata. Mr Greaves uses narcotics and stimulants to overcome the spasms. We recommend him and all never to rely on any other plan than the simplest one that can be adopted for the removal of the cause of the spasm, viz., the obstruction. We can assure him that he needs no new instrument.]

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## REVIEW.

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*Horse Warranty. A Plain and Comprehensive Guide to the various points to be noted, showing which are essential and which are unimportant.* By PETER HOWDEN. London: Robert Hardwicke, 192 Piccadilly.

BOOKS are written by men who have widely different objects in view. There are those that condense the labours of a lifetime in a



particular department of knowledge in a modest volume, and hope to do good. They write for fame, perhaps, but with a conviction that they have something to impart which should not die with them. There are others driven from necessity to write to earn their daily bread. They write as a matter of business, and aim at excellence, that their profits may be large. But there are many who write for gain, and do so with the greatest contempt for all their readers. They want to get up a book that must sell, and they know that a good cover, good paper and printing, some illustrations, and a smattering of information for the multitude, not desirous to go deeply into things, are all the requisites for such a selling book. If they happen to get the name of a good publisher on the cover, these books ramify freely through the trade and do much harm. The daily and weekly press, tempting advertisers by praising trashy books, materially assists the bookmaker, and however bad or dangerous the production, we do not fail to find it lauded to the skies. We have repeatedly appealed to the agricultural press to aid us in ridding popular veterinary literature from volumes which disgrace it, such as "Mayhew's Illustrated Horse Doctor," "The Horse in the Stable and the Field;" and we have to ask, but no doubt must ask in vain, that they should not, in the interest of horse-breeders, horse-dealers, and, in fact, horsemen of all kinds, puff Mr Howden's Horse Warranty, which we find paragraphed all over the country.

Mr Howden commits himself sadly in his introduction. He shows that he is ignorant of the distinction between health and disease, hence between the terms soundness and unsoundness. Referring to Professor Coleman's definition, that "any deviation from nature is an unsoundness," the author says that a mechanic with hard and coarse hands would be judged unsound. "When the hands of a man had never done hard manual labour, but had always been employed in writing, his skin would remain unaltered, thin and tender, and he would be adjudged sound in consequence of his not deviating from nature." Is it a deviation from nature when parts, and especially the cuticle, are adapted for certain functions? Is the blacksmith, with large arm and shoulder muscles, unnatural? Nature is found to be perfect in her designs and operations, by her power of adaptation to altered circumstances. Such adaptation does not occur by morbid, but by healthy processes, and instead of impairing the soundness of an animal, such an adaptation renders the animal more acceptable to all who look for one really sound.

Mr Howden's absurdities are met with in numbers in every page of his book, but to show what his ideas of soundness are, let us turn to page 73, where he tells us that "the sound horse is too delicate to undergo an amount of work which distresses the legs, but he is nevertheless much coveted; while the useful horse, possessing good stamina, the power to work without causing pain to himself, and every evidence that he will long retain that power, is too



often rejected because he shows a few signs of past work." This style of writing is evidently to meet the tastes of horse-copers, who have an abundance of screws to dispose of for three figures.

Mr Howden, like many popular writers on veterinary subjects, wishes his reader to get plenty of information with little trouble, and thus at every page we find paragraphs or chapters, or whatever he may wish to call them, headed by the name of a defect, vice, or part in capital letters, and at the conclusion the term 'sound' or 'unsound' as the case may be, also in capital letters.

Thus the paragraph on 'contraction' ends in 'sound;' on 'broken knees' in 'unsound;' on 'windgalls' in 'sound;' on 'bandages' in 'unsound;' on 'splents' in 'sound;' on 'thorough pins' in 'sound;' on 'courage' in 'unsound,' &c. It is evident from these amusing specimens that the paragraphs qualify the words, thus prominently placed at the beginning and the end of a paragraph, but even when qualified it is evident that Mr Howden's opinion of Horse Warranty is as unsound as any such opinion can be. Thus, under the head "thorough pins," he says, "There are few horses who have done any work without acquiring them. They are a windgall in the hock. Unless they cause inconvenience, which is rarely the case, the horse is SOUND."

It is very remarkable how such a self-sufficient writer as Mr Howden steps over difficulties, and solves the most intricate questions. Under the head STRING-HALT, he says, "This disease may be at once detected by the awkward catch of the leg affected, the action of this leg being much higher than the others, and drawn up by a jerk. It is seldom seen in both hind legs. The collapse of the muscle, which is by some persons supposed to be the cause of this peculiar action, is occasioned by the interior of the muscle having been formed into a kind of cyst or bag by an abscess, which, having discharged the pus, leaves the interior of the muscle open. It is frequently supposed to arise from inflammation of the nerve; while others say it is an excess of energy without disease. If the latter is the case, and the horse experiences no pain or weakness, or anything to prevent it from working as well as ever, he is SOUND.

Mr Howden's ignorance is especially manifest in treating such subjects as roaring. He considers that "Roaring is a chronic disease of the windpipe, or, perhaps more correctly, the remains of such a disease." Mr Howden is never happy in his definitions, and as a fair specimen of his talents in this direction we may notice "humours." "Humours," says the author, "is a term applied to swelling of the legs and other parts of the horse, and to small spots on the body, which denote a want of medicine or bleeding."

After such specimens our readers may be induced to ask, "Who is Peter Howden?" The only reply we can favour them with is that he is the author of the worst work pretending to treat of Horse Warranty that we have yet read in any language.



# EDINBURGH VETERINARY REVIEW

AND

## *Annals of Comparative Pathology.*

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### THE PREVALENCE OF DISEASE AND THE EMPLOYMENT OF VETERINARIANS.

No one can fail to have noticed the many reports that have appeared in the daily papers as to the prevalence of diseases amongst cattle and sheep in different parts of the United Kingdom. Apart from the greater publicity being given to facts relating to diseases of the lower animals, it is evident that farmers have been unusually alarmed, and have experienced more serious losses in 1862 than most years.

The veterinary profession, under these circumstances, should bestir itself, and we think the time is fast arriving when able veterinarians will be employed, as abroad, for the prevention of disease. We are happy to notice that the importance of the veterinary art is fully recognised by the British Government, though as yet evidence has been afforded of this only by the measures taken for the arrest of small-pox in sheep. It is very essential that the nature and extent of other prevailing diseases should be investigated, so as to indicate in what way veterinary surgeons can be employed for the public benefit. What we require now is, merely the indication of practical measures that can be beneficially adopted, and we can indicate these measures only by learning where diseases exist, and how they have occurred.

It is our recommendation that veterinary inspectors should be appointed for all markets and fairs in the United Kingdom, and that they should be employed to report regularly on the maladies existing and the mortality they induce. The country can well afford to pay handsomely for this, but the public cannot be expected to perceive the advantages of such an arrangement unless some effort is made to demonstrate it to them. It is for this reason that we appeal to all veterinarians to favour us with reports such as we printed in the number of this Journal for March 1862. They will receive forms to fill up, and we shall esteem it a great favour to have them promptly



returned. In asking this, we know that we are adopting a course calculated to hasten the desirable result of obtaining suitable appointments for veterinarians, with a view to prevent destructive disorders, especially amongst farm stock.

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### SCARCITY OF VETERINARY SURGEONS.

WHATEVER may be the opinion of those who find competition in practice much too great for them, it is a fact well worthy of attention on the part of our Government, and the stockowners of the British empire, that the veterinary profession is in a very weak and inefficient state. In the first leading article published in the *Edinburgh Veterinary Review*, we said, "It is quite certain, that while most callings are crowded to excess, our profession offers scope for an increased number of well-informed and rightly-intentioned aspirants," and we noticed the remarkable fact, that in Scotland there is scarcely one veterinarian to 240 square miles of surface. The Royal College of Veterinary Surgeons has been fortunate in securing a Secretary whose first duty has been a most important one. He has worked most diligently in collecting information for a new Register, and has opened the eyes of some who have talked of the veterinary profession as being overstocked. He has shown them that we are not a thousand strong in the United Kingdom, and, in fact, that the total number of practitioners does not exceed 914. Does this represent the number which the country requires? Have we too many, or too few? This question is also solved by Mr Coates, who shows that there are more than two empirics to one qualified practitioner. There are positively upwards of a thousand men practising as, and calling themselves, veterinary surgeons, that have no qualifications at all, or a few of them may have a spurious one. Then upwards of another thousand quacks are performing cures and operations under the more modest title of 'Farriers.' We shall shortly show how unequally veterinary surgeons are distributed over the country. They congregate where there are wealthy citizens, and animals kept for luxury. However destructive disease may be amongst stock reared for the butcher, the veterinary surgeon finds no occupation in its cure or prevention. We submit in this country to eating our diseased cattle, sheep, and pigs; and hence do we find that there are nearly 120 out of the 914 veterinarians in Middlesex, and the majority of these in London and its suburbs.



When we consider that in any profession the clever and useful men do not amount to much above fifty per cent. of the total number, it is evident that there are very few expert veterinarians to attend to stock, amounting in value to nearly L.130,000,000 sterling. Is it to be wondered at, then, that we are losing annually by disease amongst stock, nearly, if not quite, as much as the Government realizes by the property and income tax? If over thousands of acres of land valuable stock is left to the mercy of the cow-leech and the butcher, we can only expect what actually occurs, viz., waste and destruction.

But it is not number alone we want. It is quality. Let us ponder for a moment over our experience of the last twenty years: cattle plagues raging, farmers ruined, cattle insurance companies in a state of bankruptcy, stock diminished in quantity, beef and mutton raised in price, and veterinary surgeons slumbering. If we cast a glance at our book shelves, we find a few treatises on the diseases of the horse published; one or two books on materia medica; but these amidst a mass of trashy productions of popular veterinary literature, which are a disgrace to their authors and to their publishers. Within the last seven years some evidence of progress and tendency to reform has been manifested in Edinburgh, and this very Journal is but one of several publications issued from the New Veterinary College, for the purpose of advancing veterinary science in this country. We have not lacked encouragement. Friends have been fast, and our enemies have been few. The most resolute opponents have been those who, fearing that the market for their diseased cattle would be closed owing to our exposures, have thought proper to disregard much that has been done for their good. They are changing tone, and we are happy to see an Agricultural Journal—the only one that has ever manifested any decidedly unfriendly feeling towards us—with a leading article in a recent number, insisting on legislation for the prevention of cattle plagues. With his usual fairness, the Editor of the periodical alluded to, takes a vast amount of credit unto himself for drawing attention to matters which we alone have insisted on for years past.

What this country needs, for the protection of the stockowner's interests, is stated in a very few words. It needs reforms in the system of veterinary teaching, so as to improve the quality of our veterinarians. It needs Government interference, to control the distribution of veterinarians, that they may study the causes of disease



in stock and counteract them. Lastly, veterinary surgeons must be better paid to prevent disease than to cure it.

Referring to the prevalence of cattle disease, and the common practice of selling the produce of diseased animals as human food, a British Peer said recently, that "for such matters in this country we have no Government." If an active Member of the House of Lords thus proves himself alive to the importance of this truly momentous question, "the preservation of the lives of our animals," there is some hope of amendment in future.

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### DISPUTES CONCERNING HORSES.

A CASE has occurred recently, which, from the dealer deeming "discretion the better part of valour," cannot attract the attention it deserves, as an excellent illustration of the evils arising from the existing state of the law of warranty. As that excellent journal, the *Sporting Gazette*, has noticed it, we think it may be as well to refer briefly to the leading features of so interesting a case.

Mr William Collins, of Mount Street, Lambeth, sought to recover L.550 for depreciation of value, loss of profit, and expenses incurred by the alleged purchase, and subsequent lameness, of the six-year-old steeple chase horse Sampson, by Stockwell out of Gadabout, who gained the first prize for hunters at the North Lincolnshire Agricultural Show last year. The horse was purchased in the month of August last, from Mr Richardson of Willoughton, Lincolnshire, for L.350. Mr Richardson was induced to have the horse examined by three veterinary surgeons, prior to delivery, owing to a word of caution from some of his friends. Mr Jekyll of Lincoln, Mr Wilson of Caistor, and Mr Pickering of Gainsborough, were the persons employed, and they declared the horse quite sound. The animal was travelled by Mr Collins' groom a distance of sixteen miles by road, and then put in the train for Watford. Next morning it was found that he could scarcely crawl out of his box. Advice was sought, and the veterinary surgeon, Mr South of Bond Street, had the hind shoes removed, and in the next place, the off hip fomented. Ultimately, he came to the conclusion that the seat of injury or disease was the off hock. In the meantime a correspondence took place between Mr Collins and Mr Richardson, which resulted in the latter gentleman having the horse examined,



and it was found that the hocks had been blemished and bruised, and the animal was decidedly lame. A dispute arose as to the condition of the animal, and other veterinary surgeons, viz., Mr Lawson of Manchester and Mr Cartledge of Sheffield, and Mr Lepper of Aylesbury, found swelling and inflammation of the off hock, but also that the *near fore foot* had been pared to the quick, rendering the animal so lame on that limb as not to be able to support the least weight on it. The symptoms of acute lameness passed off, and on the occasion of some of the veterinary surgeons for Mr Richardson being called upon to examine the animal, they found he had been at exercise or at work, and moved freely. Mr Collins obtained certificates from Professors Spooner, Varnell, and Dick, and from Messrs Mavor, Field, Farral, and South, to the effect that the horse had disease (not specified in the certificates) in the hocks, which must have existed at the time of sale. On the other hand, Professors Gamgee, senior and junior, Messrs Hunt of Birmingham, Dray of Leeds, Naylor of Wakefield, Cartwright of Wolverhampton, together with the veterinary surgeons that had previously examined the horse, viz., Messrs Jekyll of Lincoln, Wilson of Caistor, Lepper of Aylesbury, Lawson of Manchester, Ellis of Liverpool, Cartledge of Sheffield, Cuthbert of Leeds, pronounced the horse sound on the 18th ult., and recognised the blemishes contracted since the sale.

The *Sporting Gazette* says, "in addition to this long list of "vets." the defendant had in attendance Mr William King (the trainer) of Doncaster, who had Sampson in his charge up to within two months of his (Sampson's) sale. There were also in London, on the defendant's behalf, Mr C. Wood of Brierby, Mr Booth of Killesby, and Mr Godson of Normanby, the three gentlemen who were the judges at the North Lincolnshire Agricultural Show in August 1862, and who awarded to Sampson the first prize for being the best hunter exhibited at the show. This formidable array of witnesses in favour of Sampson's soundness when delivered over to the plaintiff, appeared to exercise a vast influence over Mr Collins, as he, after diver and sundry consultations, proffered to the defendant the desirability of withdrawing the cause. This proposition was consented to, upon the condition that the plaintiff paid the defendant L.100 towards paying his (defendant's) costs. Mr Collins having paid the "century," the action was withdrawn without going into court.



**ROYAL COLLEGE OF VETERINARY SURGEONS.**

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**QUARTERLY MEETING OF COUNCIL.**

The Quarterly Meeting of the Council was held this 30th day of January, 1863.

**PRESENT :—**The President, Professor Spooner, Messrs Barrow, Broad, Ellis, Ernes, Harpley, Hunt, Jex, Lawson, Mavor, Moon, Robinson, Silvester, Varnell, Wilkinson, and the Secretary.—The President in the Chair.

The minutes of the preceding meeting were read and confirmed. The secretary read a letter from the Foreign Office, transmitting four copies of a Report of the Veterinary Institutions in Saxony for presentation to the Royal College of Veterinary Surgeons. He also laid on the table a presentation copy of Messrs Brande & Taylor's new work on Chemistry for the library of the College. The thanks of the Council were ordered to be given for the presentations.

A letter was read from Mr Thomas Hickman, late veterinary surgeon in the army, requesting that he might be furnished with a new diploma or certificate of his having passed his examination; he having lost his original diploma while on service in India, from its having been stolen by the natives. He had used every means, by advertising in the Indian journals, for its recovery, but without success. After a lengthy discussion, it was moved by Mr Harpley, and seconded by Mr Mavor—"That Mr Hickman's being an exceptional case, the Council would take it into their favourable consideration, and grant him a new Diploma."—Carried. It was resolved—"That Certificate, signed by the president and secretary, to the following effect, be forwarded to Mr Hickman. It having been shown to the satisfaction of the Council of the Royal College of Veterinary Surgeons that the diploma belonging to Mr Thomas Hickman was lost in India during the late mutiny, we, the president and secretary of the Royal College of Veterinary Surgeons, do, by the instructions of the Council, hereby certify that Mr Thomas Hickman did pass his examination as a veterinary surgeon on the 11th day of May 1853."—(Signed) James Beart Simonds; William Henry Coates.

The registrar reported that six deaths had occurred during the past quarter; viz., Mr Wm. Charnley, Wrexham, Denbigh, 1835; Mr Geo. Cooke, Newcastle-on-Tyne, 1841; Mr Bernard Reynolds, Newbridge, 1851; Mr Daniel Bovett, Bridgewater, 1835; Mr Robert Cook, Erith, Kent, 1848; and Mr John Kent, Bristol, 1813. Also, that four members had been admitted during the same period, late pupils of the Royal Veterinary College, London.

It was proposed by Mr Ernes, and seconded by Mr Broad—"That a report be presented to the Council by the secretary after every examination of candidates for the Diploma, as to the number



examined, those that have passed, those that have been rejected, and also the names of the examiners, and other persons who were present.”—Carried.

The president drew the attention of the Council to the Bye-law No. 28, relating to pupils presenting themselves more than three times for examination. After some discussion, it was resolved—“That the most liberal construction be put on law 28.”

It was further resolved—“That the president call the attention of the Court of Examiners to Bye-law 33, and express to them the wish of the Council that the rejected pupils be addressed by the Chairman of the Court.”

Notice of Motion was then given by Mr Wilkinson :—

“That to meet the difficulty of the case relative to the construction to be put on Bye-law 28, he would suspend a notice for the alteration of Bye-law 28.”

The Finance Committee reported, that they had examined the vouchers and receipts of payment, during the past quarter, and found them correct.

The quarterly balance sheet of the Treasurer’s account was read, from which it appeared that the present liabilities amounted to £63, 11s., 10d. The balance in Banker’s hands is £399, 5s. 4d., and cheques were ordered to be drawn for the current liabilities. The Report was adopted.

The Registration Committee reported that they had carefully revised the Register, and now laid on the table one dozen proofs complete to the present time. They asked for one thousand copies to be printed. The Report was adopted.

The Inquiry Committee submitted their report. The statistical account, as prepared by the Secretary, showed that the total amount of letters received was 394 ; the number of practising veterinary surgeons throughout the kingdom 914 ; those who assume the title of veterinary surgeons, 1,244 ; and those practising as farriers, 1,189. The report was adopted. It was resolved, “That the report be printed, and distributed amongst the members of the Council.”

The business of the quarterly meeting having terminated, a special meeting was then convened, to consider the alteration of of bye-law 27. On its being brought up and discussed, it was resolved, “That a special meeting of the Council be called within fourteen days to confirm the alteration about to be made in bye-law 27.” On its being brought up and discussed—after having been proposed by Mr Harpley, and seconded by Mr Wilkinson, the proposed alteration to the following effect was carried, “Each candidate intending to present himself for examination, shall forward in writing to the Secretary of the Royal College of Veterinary Surgeons a notice of his so doing not less than seven days prior to the examination taking place. He shall also at the same time forward to the Secretary such certificate, or other legal proof, as may be required, as to his having been educated at some one of the recognised col-



leges, and also the fee of £7 7s. for such examination." It was resolved, "That a special meeting of the Council be called within fourteen days to confirm the alteration now made in bye-law 27." Mr Robertson gave notice of a proposed new bye-law relative to the section of the Board of Examiners acting for Scotland, which was ordered to be suspended in the Board Room for three months.

At a special meeting of the Council, held this 11th day of February 1863, for the purpose of confirming the alteration of bye-law 27—present, the President, Messrs Braby, Dickens, Field, Harpley, Moon, Varnell, Wilkinson, and Secretary. The president in the chair. The minutes of the special meeting, at which the said bye-law was adopted, were read and confirmed. The president then called the attention of the meeting to the regulations of the Charter for re-making of alterations in the Bye-laws, when it was moved by Mr Harpley, and seconded by Mr Braby:—

That the alteration of Bye-law 27, made at the meeting of the Council held on January 30, be now duly confirmed.—Carried.

By order of the Council,

WM. HENRY COATES, *Secretary*.

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## VETERINARY JURISPRUDENCE.

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### HORSE WARRANTY.

At the usual monthly sitting of the HORNCASTLE COUNTY COURT, on Wednesday, 11th February, the following Jury case excited considerable interest, and the Court was densely crowded:

WOODROFFE (ROBERT) *v* KEMP (SAMUEL HARRISON).

THIS was an action brought to recover the sum of £13 8s., for loss sustained through breach of warranty of a horse sold by defendant to plaintiff at Horncastle fair, on the 14th of August last. Mr Toynbee appeared for plaintiff and Mr Brackenbury for defendant. Mr Toynbee having laid the particulars before the jury, proceeded to call the following witnesses.

Mr R. Woodroffe, sworn: I am the plaintiff in this action and reside at Scamblesby. On the 14th of August I purchased of Mr Kemp a mare for £32 10s. Mr John Walter and Mr R. Grantham were present when I bought it. Mr G., who rode the mare, noticed a peculiarity in her action and pointed it out. Mr Kemp said it arose from rawness, it not having been ridden lately. I paid for it on the 16th, and it was delivered on the 18th. I saw her run out when delivered, and said I thought she would be all right. On the following day (Tuesday) I rode her to Hemingby. On Wednesday to Horncastle and back, and again on Thursday, when I met Mr R. Martin on the road and he pointed out the lameness. I rode her again on the Saturday, and on the Wednesday following I rode her to Louth, and had her examined by Mr Gresswell, veterinary surgeon, who said she was lame. Afterwards sent for Mr Gresswell, and he came on the Saturday following, and gave me a certificate of lameness. I shewed this certificate to Mr Kemp, he said he was very sorry; and asked me to keep the mare a short time longer. On Sunday, Mr Kemp sent Mr Clayworth, jun., to examine the mare, and he said she was lame. Mr Clayworth, sen., with his son, saw her on the next Saturday. He said she was lame of one fore foot, and advised me to keep



her. I saw Mr Kemp at Horncastle on the same day, and he asked me to keep her another week or two, and if she were not then better he would take her back. I kept her 8 or 9 weeks altogether, and she was unsound all the time, more or less. Mr Kemp ultimately refusing to take her back, she was sold by auction on October 25th, for £24 10s. Mr Jekyll examined her. Cross-examined by Mr Brackenbury: I do not generally ride fast. She was very raw and fat when purchased. I do not recollect galloping her through Scamblesby village. Myself and brother rode her up to August 27th, but only short distances. Mr Kemp said she was fit for work. Don't recollect Mr Clayworth, sen., advising me as to her treatment. By Mr Toynbee: Mr Clayworth, sen., said stopping the feet was improper treatment. I never rode her fast except about a quarter of a mile at one time, and never more than 12 or 14 miles in a day.

Mr Wm. Woodroffe, brother of plaintiff, deposed to riding the mare for exercise five or six times, but did not gallop.

Mr R. Grantham sworn: I rode the mare when it was purchased by plaintiff and called attention to her peculiar action. Mr Kemp said she had been ridden only about a week. I saw her again on the 25th, at Mr Woodroffe's. She was then lame of both fore feet, which were very hot. Mr Kemp told me on the 30th, he would send his veterinary surgeon to examine her. He afterwards said he would not take her back as Mr Clayworth said she was sound. By Mr Brackenbury: I should have put her to gentle work but not have given her medicine, as I should expect Mr Kemp had done so. When I rode her she was raw but not very fat.

Mr John Walter sworn: I was present when the mare was sold to plaintiff. I told Mr Kemp I did not like her going with her fore feet. He said it was only rawness, and she would get better of it. She was lame when I saw her at Scamblesby about ten days after. I went with Mr Woodroffe to see Mr Kemp, who said he would take her again if she were not better.

Mr John Scholey sworn: I saw the mare when delivered at Mr Woodroffe's, and said she was lame of both fore legs. I rode about two miles on grass by her side the day after, and she was lame then.

Mr Robert Martin deposed to riding with Mr Woodroffe on the 22d of August, and pointed out that she was lame of both her fore feet.

Mr William Bourne, wheelwright, of Scamblesby, said he was at Mr Woodroffe's when Mr Clayworth was there. Mr C. said she was lame enough, and when he took her foot up remarked she had had too much corn. By Mr Brackenbury: I was not in the stable, and did not see her stand on any manure.

T. Coates, groom for Mr Woodroffe, in August, said he fed the mare. She had three-quarters of a peck of oats per day, and sometimes a bran mash. He also noticed a slight running thrush, and mentioned it to Mr Woodroffe.

Mr Gresswell, veterinary surgeon, Louth, sworn: I saw the mare on the 27th of August, and she was then lame of both fore feet. There was a little openness on the off side. The lameness proceeded from fever in the feet. I should judge from the ridges on the hoof that it had existed for three months. The feet were very hot. The hoof grows from the coronet to the ground surface in ten or twelve months. The duration of the disease is ascertained by measuring the secretion on the hoof. In this case it measured about one-third of the distance. The secretion causes the hoof to be rough and ridgy. The present state of the hoof is no criterion, as a rasp would remove all the rings, &c. I should say the mare has naturally a good action. Ridges may be produced by being turned out to grass, or a blister, but then only one would be formed. In this case there was a succession of ridges. By Mr Brackenbury: I have never seen any horses with very ridgy feet that were sound. Horses suffering from fever in the feet might become sound without treatment. She had been suffering from influenza, which would weaken the constitution but would not produce lameness. The mare soon recovered from the influenza, which might produce disease of the lungs but not lameness. Gentle exercise would not injure the mare, neither would stopping the feet.



Mr Jekyll, veterinary surgeon, of Lincoln, said he examined the mare for Mr Woodroffe on October 22d, and found her lame of both fore feet. Witness corroborated Mr Gresswell's testimony as to the nature and indications of the disease, also said that fever often made its appearance in four or five hours, and the mare might have suffered from low fever in the feet and Mr Kemp not be aware of it.

Mr J. Walter, re-called, said he saw the mare at Horncastle last Saturday, and when walking over some loose gravel she was very lame.—This concluded the plaintiff's case, and Mr Brackenbury having addressed the jury for the defendant, called

Mr S. H. Kemp, who deposed: I bred the mare and sold her to Mr Woodroffe at August fair. I had not worked her hard, and did not know she was lame. I examined her feet, they were perfectly sound and open. She had had a slight attack of influenza and was not fit for hard work. The mare was delivered on August 18th, and no complaint made when paid for on the 23d. She was sound then and has been ever since. By Mr Toynbee: I have never seen her lame. I asked Mr Woodroffe to keep her. I did not say after Mr Clayworth, jun., had seen her that I would take her back. I refused because I thought Mr Woodroffe had lamed her. By Mr Toynbee: I never ordered the mare's feet to be rasped.

William Ward, groom, said he broke in the mare in July. Her feet were good when shod, and he never noticed any lameness. She was quite sound when left at Mr Woodroffe's.

Jos. Freshney, blacksmith, of Baumber, shod the mare in May, and again in July and August, but did not detect any lameness.

Mr Jos. Clayworth, jun., veterinary surgeon, of Horncastle, deposed: I examined the mare on August 31st, and found her lame of both fore legs. There was a thrush on the left fore foot. The lameness was caused by soreness and swelling brought on by weakness of the blood-vessels and neglect. She was standing on hot manure, and the stall looked as if it had not been cleaned out for a week. This would cause lameness. I said she would soon be all right if treated by Mr Gresswell. I saw the mare again with my father on September 6th. She then suffered from the thrush but was not lame on the other foot. I next saw her on October 7th. She was then sound on both fore legs. Mr Kemp lent her to me after she was bought in for him at the sale by auction, and I have worked her hard ever since. She is now perfectly sound and has not received any treatment. By Mr Toynbee: Standing on hot manure will invariably produce the weakness and lameness in three days. The feet were not hot. There were no rings or ridges on the hoofs. I believe she was not lame on the 18th of August.

Mr Joseph Clayworth, sen., veterinary surgeon, of Hundleby, deposed: When I examined the mare with my son, she was lame of both fore legs. The thrush would partly account for it. If there had been fever in the feet there would have been traces of it, but I saw none. By Mr Toynbee: The disease I saw had not existed from three to five days. It might have been there five or ten or even twelve days. I think it did not exist on the 18th of August, as there were no appearances of chronic disease. I noticed a hollowness of the foot, which is an indication of severe fever, but no ridges on the hoof.

Mr Bland, veterinary surgeon, of Boston, deposed: I examined the mare at Kirkstead on December 26th, and found her perfectly sound, with no symptoms of recent lameness. There were no indications of fever in the feet. I do not believe in the theory of Mr Gresswell and Mr Jekyll. By Mr Toynbee: There were no marks of disease on the feet. Fever comes on suddenly in some cases.

Mr H. Tomblin, huntsman of the South Wold Hounds, deposed to seeing Mr Woodroffe ride the mare in August, and he did not notice any lameness.

William Medcalf, groom to Mr Martin, of Scamblesby, said he saw Mr Woodroffe and his brother ride the mare in August. She was trotted beyond her pace and broke into a gallop. He did not notice any lameness.

Mr William Ashton of Horncastle deposed to shoeing the mare two or three times since October, and considered she had good open feet. He did not rasp the hoofs unfairly.



Captain Conington said he saw the mare trot and jump over some fences on December 24th, and she appeared perfectly sound.

The plaintiff, recalled, said Mr Clayworth, sen., told him the mare was returnable, which statement was corroborated by Mr Grantham, who was present at the time.

Mr Clayworth said he told Mr W. that if thrush existed on August 18th, she was returnable, and Mr W. said it did not.

This being the case for the defendant, his Honour in summing up made some excellent remarks on the evidence. After a short consultation, and an examination of the horse (which had been brought into the street for that purpose), the jury returned a verdict for plaintiff for the full amount.

### DISEASED SHEEP.

KING (J. R., of North Ormsby), v. SMITH (Benj., of Frieston).

(Before J. G. TEED, Esq., Q.C., Judge.)

SPILSBY COUNTY COURT, February 6.

THIS important case, which had been adjourned from the last court, came on for hearing to-day. It evidently excited intense interest among cattle dealers and the principal sheep breeders of North Lincolnshire, as a large number of both classes were in attendance during the day. The trial lasted about seven hours, and the spacious sessions-hall, in which it took place, was filled during the whole time. The plaintiff had laid his damage at £80, but reduced his claim to £50, to bring it within the jurisdiction of the court. Mr F. Allison of Louth appeared for the plaintiff, and Mr Toynbee of Lincoln for the defendant. The following composed the jury:—Messrs T. C. Maidens, George Cartwright, Henry Searby, Frank Riggall, J. B. Towler, Marshall Heanley, Cartwright Mayfield, William Sharp, John Bond, John Swain, Charles Brooks, and William Morton, jun.

Mr Allison, in a lengthened address, stated the case to the jury, and dwelt upon its importance to cattle dealers, graziers, and agriculturists generally. He said the object of his client was not to put money into his pocket. As far as pecuniary considerations went it was to Mr King a matter of indifference whether he won or lost the case. Their decision would tend to regulate the future conduct of farmers not only in Lincolnshire but in other parts of the kingdom. He would place before them the facts and the law of the case, and then confidently leave the decision in their hands. It might, he said, be some satisfaction to the jury to know that this was so far an amicable suit that himself and Mr Toynbee had between them settled the list of the jury. The case was one of scabbed sheep, and he minutely described the disease, which he said was of ancient date, and existed in the days of Virgil, who had given a full description of it in his poems. There were three points on which he should rest his case. That the defendant knew when he took these sheep to the fair that they were suffering from scab; that they had been affected with scab prior to and at the time of sale; and that for sheep sold at Partney and the other sheep fairs in North Lincolnshire there is, although no express words to that effect be used, an implied warranty that for a sound price the buyer shall have an animal sound and free from contagious disease. He referred to the cases *Jones v. Bowden*, *Weal v. King*, *Gray v. Coxe*, and to a decision given by Justice Heath fifty years ago, and which he contended held good at the present day.

His Honour: Were these sheep sold as stock?

Mr Allison: Yes; that is one of our points. It is the custom, we say, of the trade that stock sold at these fairs is sold as sound stock whether sold for grazing or breeding purposes. He should be able to prove that the defendant knew these sheep to be diseased, and that he was notorious for selling scabbed sheep, having sold some at Horncastle October fair.



Mr Toynbee objected to anything being said about Horncastle fair. One case of scabbed sheep was quite enough.—The following evidence in support of the plaintiff's case was then given:—

John Robert King, the plaintiff, said, I occupy land at Ormsby, in the Middle Marsh, and at Stewton, altogether about 1000 acres. I was at Partney fair on the 18th September last, and had bought 33 sheep of Mr Morley, when the defendant called my attention to a lot of sheep, and said, "Will you buy a lot of poor sheep, which will do you some good?" He asked 40s. for them. I said they look like 36s. sheep. He then said he had two other lots. I looked at them and said, "What will you take for the three?" He replied "two guineas." I said I have just left a lot of young sheep of Mr Mundy's, and I would prefer them if I could get them. On going to Mundy's pens I found his sheep were sold, and I came back to Mr Smith and bid him 39s. for the three lots. He said, "If you cannot give more than that you shall not have them; but look here, I have another lot which they are culling from." They were old sheep. I did not like them, and bid him 40s. for the three lots only. He said, "I will not sell the three lots for that, but if you will take the other 24 sheep you shall have them," and on these terms we agreed. Hitherto the different lots had been divided from each other by trays set across the pens, but when we had agreed the defendant told his men to take up the trays and let them all run together. I said, "Wait a minute, and I will count them, as they are in the pens." I did so, and there were altogether 204. The fair was on Thursday. The sheep were taken that night to Brinkhill, and the next day to my Stewton farm. On Friday evening I went to Stewton to tell my shepherd what to do with them. I wanted part of them for breeding and part for feeding. On Monday I took my Ormsby shepherd with me, and went to Stewton again. I took the shepherd to mouth them over, and select the breeding sheep from the others. In consequence of what the Stewton shepherd said, both the shepherds and myself examined the sheep, and found some of them scabbed. The sheep in that state were marked c. The sheep of one lot were marked c, some were marked with n, some with o, and 24 had no mark at all. Those marked c were the most scabbed. I had never seen scab before. I bought the same day a lot of Mr Bothamley and a lot of Mr Morley. None of them were scabbed. I have been a seller of sheep for twenty years. I have never been asked the question whether the sheep were scabbed, nor have I ever asked it myself.

By his Honour: The sheep were said to be in such an advanced state of disease that the defendant must have known they were scabbed.

By Mr Allison: When the sheep were examined there were spots on different parts of their bodies. Some spots were as big as a penny-piece, and were a kind of crust under the wool: they were on the skin. I merely examined the sheep, or a few of them, at the fair to ascertain their ages. When my men afterwards examined them I observed they winced.

By Mr Toynbee: I have since sold some sheep to Mr Cuthbert: they had been in the same field as those I bought of the defendant, only they were separated by nets. I had the sheep dressed twice. The Partney fair sheep were kept by themselves. Mr Gresswell tells me the disease is now in the sheep in a dormant state, and when the weather is warm will come again unless they be dressed. I cannot tell the cost of the ointment we have used. I never thought to look for scab when I bought the sheep. I did not think it needful. We first thoroughly examined them on the Monday. I cannot say how many were marked c, but every sheep so marked was bought of Smith, who told me of whom he bought the sheep. I paid the men for dressing the sheep on the 10th of October. I did not commence dressing them for more than a fortnight after the fair. I have known cases in which people have bought scabbed sheep, and have returned them. It is a rare thing for scabbed sheep to be sold in a fair. This is the only case I know of. None of these sheep bit me when I opened their mouths. I only found five or six sheep scabbed on the Monday.

James Morley, a jobber and farmer, at Raithby, said, I sold Mr King 33 sheep at Partney fair. They were from Mr Preston's flock of Dalby, and had never



had the scab. I do not know that it is the habit of the defendant to sell scabbed sheep. Did not say a month ago at Spilsby that Smith, Mundy, and I have bought scabbed sheep in the south country and sold them in this.

Mr Toynbee objected to the question.

His Honour: If Mr Morley said so it is no evidence against Smith.

Cross-examined: Perhaps I sell 2000 sheep or more at Partney in the course of a year. I never knew any person buying sheep in the fair to return them afterwards. It is not common to have scabbed sheep in this neighbourhood. There are more on the Peterboro' side. I never knew many scabbed sheep get to Partney.

By Mr Allison: I have never been asked if my sheep were scabbed.

William Everett said, I have been a drover for twenty years, and at last Partney September fair was engaged by Mr King to take a lot of sheep to Stewton. When on the road I noticed the sheep turned round to nag themselves. I never saw sheep go on like these in my life. I stopped with the sheep at Brinkhill on the fair night. I noticed the wool was in a very rough state. I examined one sheep, and found a few worms on the top of the tail. It had been dressed on the back. I got to Stewton the next day about 5 o'clock.

By Mr Toynbee: I have seen sheep bitten by the fly on those parts where this sheep had been dressed. The dressing had been something dark. It might have been sheep salve. Several naggged themselves, but I did not count how many: it might be half-a-score.

George Cole said, I am shepherd to Mr King of Stewton. I am acquainted with the scab. Saw signs of it in these sheep, and told the foreman so. I thought so by their scratching and biting about so. The foreman and I examined some, and when master came, on the Monday after, we examined them again. The scab had then risen half-an-inch in the wool on the back of the neck and in the shoulder. It was a kind of grey colour. The sheep that were scabbed were marked c. I found three or four on Monday, and on Wednesday we examined them again, when we found about six. The scab was of a dark colour. I am certain it was the disease called scab. I have salved them twice, and they are not cured yet.

By Mr Toynbee: When we had had the sheep between fourteen and twenty-one days, there were 62 sheep in the scab. I do not know how many were marked c: the brand was getting worn out, but all were so marked that were scabbed.

Joseph Kitchen said, I am shepherd to the plaintiff at Ormsby. I went with master to Stewton on the Monday after Partney fair. We examined the sheep which had come from the fair. As we were examining them, I saw one try to bite Cole's hand. He said, "Shepherd, what do you call this? it has a bad look with it. I think it has got the scab." I said, I am satisfied it has.

By Mr Toynbee: It is twenty years since I saw scab before: it was when I was a boy, and lived beyond Boston.

John Cator said, I live at Fotherby, and have had a good deal to do with sheep having the scab. Saw Mr King's sheep at Stewton. 62 of the worst were put out. They could not have had the scab less than six or eight weeks. Some of the scabs were half-an-inch thick. They had come out in different parts of their bodies. He had salved sheep for the scab in different parts of North Lincolnshire.

Fred. Sooby: I occupy a large Wold farm near Louth, and have some acquaintance with scab. I went with the plaintiff to Stewton on the Wednesday after Partney fair. I examined the sheep, and found some very much diseased. The scab had risen half an inch in thickness, and was of considerable breadth. There were enough of them scabbed to satisfy me that the whole flock was infected. I once sold a lot of sheep to Mr Mawer of Partney: it was in 1860, at Louth, and he took them to Boston fair, where it was discovered that they were affected with scab. He wrote to me respecting them, and I desired him to return them, as I had discovered that my flock was infected, and I was afraid that many actions would be brought against me if I allowed them to be dispersed. I always



considered that if people buy scabbed sheep in a market or fair, not knowing them to be so, the seller is liable to have them returned. It is not the custom to ask if sheep are scabbed. It is presumed that they are sound, and Mr King is not to blame, for not asking that question when he bought the sheep of the defendant.

By his Honour : If a man were to sell sheep in a market or fair, and they were afterwards found to be affected with scab, he would be expected to take them back again.

By Mr Toynbee : It was in the month of May I sold the sheep to Mr Mawer. Before then I had clipped several, and sent some to Manchester and some into Yorkshire. They did not show any signs of disease. My reason for taking the sheep back from Mr Mawer was, that I was fearful I should have as many actions as the lots in which they might be sold.

Thos. Mason said, I was a farmer in the Middle Marsh for seventeen years, and have been an auctioneer during the last twelve years. My impression is, that in any fair, if I give a good and sound price, I have a right to have a sound animal. I never asked a question when buying or been asked when selling, whether sheep were scabbed. In selling by auction we sell under special conditions. A case of scab came before me as auctioneer two years ago. I publicly declared the sheep were infected, and made more of them by the declaration than I should if I had not stated it. With regard to sheep generally, I consider giving a sound price a warranty that the animals are sound. It is not in this case unreasonable to ask for £50 as a recompense.

John Foster said, I have been a farmer several years, and keep about 700 sheep. I always understand that I am buying sound sheep in a market or fair. I never look for disease, because I expect I am buying sound sheep.

Thos. Horton said, I have bought sheep for 20 years. I never examine sheep when buying in a market, to see if they have scab. If they looked bad I should examine them. It is not the custom to ask questions as to that. Giddy sheep, or those affected with water on the brain, are returnable. It is not customary to examine sheep minutely in a fair, because it is not expected that they are scabbed.

By Mr Toynbee : Mr Byron never asked me about having scabbed sheep. If I bought such sheep I should keep them for the day at least, and sell them if I could. If I sold sheep in a fair which I knew to be affected, I should have the fear of the County Court before my eyes. I think the custom is if sheep are sold in a fair as sound, which afterwards turn out to have been affected with scab, the person selling them is liable to take them back. I have never known that custom acted upon.

Mr Toynbee objected to any evidence as to custom : it would, he said, be contrary to the common law.

Mr Allison : I rely upon the dictum of Justice Heath, and that when we go into our fairs we have sound stock.

His Honour : What I want to make out is, that the sheep were set down as sound : the point really is, scab or no scab.

Samuel Hobson said, I have been a Wold farmer for forty years. I have never asked the question, and have never been asked in any fair, whether the sheep were scabbed. I take it for granted that they are sound, because they are there, and that they are offered as sound stock.

His Honour : What I want to have established is, that sheep shall be sound when offered in a fair.

Mr Allison : What I mean is, that when sheep are offered in a fair there is an implied warranty.

Thomas Stones said, I was at Partney fair and bought some sheep of Mr Smith. A few days after I saw one rubbing herself. I caught her and found she had the scab. She infected the flock. I told Mr Smith of it at Horncastle fair. He said it was a bad job : he had turned out 80 that day, which had never been offered for sale. He also said he had received a letter from Mr King saying his sheep were scabbed too.



By Mr Toynbee: Mr Smith said he had sent them out of the fair.

John Fisher said, I am a farmer at Sutton-on-Trent. My impression is that when I am buying sheep at a fair I am buying sound animals. At the last Partney fair I bought 80 of the defendant, and in about a fortnight after I found they were scabbed. This is the first time I have been so taken in.

By Mr Toynbee: I had the sheep ten days before I found that any of them were scabbed. I never took any steps to find out where Mr Smith lived. I thought it better to cure them if I could, and make the best of a bad bargain.

William Hornby said, I am a farmer, residing at Sutton-on-Trent. I was at Partney fair. I consider there is no custom but a mutual understanding between buyer and seller that the stock is sound. I never ask if sheep are scabbed. My sheep have the scab, and have no doubt it came from Mr Smith's sheep. It was about ten days after Partney fair when I discovered it. The disease was then about two months old; there is no mistake about it.

Henry George Graves said, I breed largely, and attend the Lincoln and Caistor fairs. I always expect when an animal is sold in the market it is a good and sound animal. I have sometimes sold a giddy sheep, not knowing it to be so, and on its being discovered have either taken it back or given the difference in value.

Mr Thomas Brooks of Croxby, and Mr John Iles of Binbrook, gave similar evidence.

Mr William Allat of Glington, Northamptonshire, said, I buy and sell sheep near Peterboro'. When sheep are offered we understand they are sound. I once bought some scabbed sheep, and returned them. I bought them of a jobber, and on finding they were scabbed threatened him with an action, and he took the sheep back and returned the money.

Mr Daniel Gresswell said, I am a veterinary surgeon, and have been in practice at Louth twenty-two years. From what has been stated respecting these sheep it is certain they did not become infected after the Partney fair. They could not have been infected less than five weeks. The scab would have been visible about ten days before the fair.

James Simons, Professor at the Royal Veterinary College, London, minutely and at length described the disease from the first deposit of the insect until it became fully developed. In these sheep the disease would have been visible before Partney fair, if it had been looked for.

Richard Bradshaw said, I am a farmer and valuer. If I sell sheep in a fair or market I should expect to sell them as sound, and if I wanted to buy I should not think of asking, are these sheep scabbed? I have had scabbed sheep, but neither bought nor bred them. I was left in trust by a neighbour, and his sheep were scabbed.

This was the plaintiff's case, and Mr Toynbee then said, If I understand the case correctly there is on the third point raised by Mr Allison no case to go to the jury. The only question I submit for the jury to decide is whether at the time of sale Mr Smith knew these sheep to be diseased. There is no evidence of the custom of an implied warranty.

His Honour: I think there has been some evidence of custom.

Mr Toynbee then said as his Honour thought there was some evidence of custom, he should address them generally on this case, which he proceeded to do, and afterwards called the following witnesses for the defendant:—

Mr George Houlden said, before Partney fair I sold Mr Smith some sheep: they were free from scab. I was at the fair and saw Mr King in the pens. I went to him and found there the sheep Smith had bought of me. Mr King was anxious to know what he had given me for them.

Mr Bland, veterinary surgeon, of Boston, said, I have been to Digby, to Mr Cook's farm, to examine his flock. They were all free from scab. It is since the last Spilsby court that I have been.

Mr William Armstrong said, I bought some sheep of Mr Cooke, and sold them again to the defendant on the 10th or 11th of September. There was no scab among them.



Mr John Bramley said, in September last I sold two hundred sheep to Mr Smith. My sheep never had the scab.

Mr Thomas B. Dring said, I was with Mr King just before and after he bought these sheep. I saw nothing in their appearance to lead me to believe there was anything wrong. I have bought and sold sheep at Partney fairs for forty years. Never before heard of the custom spoken of to-day. My own feeling is, "take care buyer; take care seller."

By Mr Allison: It is not usual to ask whether the sheep are sound or not.

Mr Thomas Plowright said, I live at Pinchbeck. Last year I clipped 2700 fleeces. I have been to Lincoln, Caistor, Boston, and other sheep marts in this county, and I never before to-day heard of the custom which has been spoken of. I have grazed hundreds of thousands of sheep in my time. I have bought sheep affected with scab, not knowing it to be the case, but I have never thought of returning them or of relying upon an implied warranty. A year ago I bought one hundred sheep infected with scab. It is a disease which is easily cured if taken in time. It is quite possible for sheep to have the scab and for it not to be known. I consider it quite probable Mr Smith or any other gentleman might have sheep so diseased and not know it.

Mr Winder said, I have been a dealer in sheep and cattle for forty-six years, and only once, to the best of my recollection, missed Partney fairs; but never in my life before heard of the custom spoken of to-day. I have bought scabbed sheep and sold them also.

By Mr Allison: I never sought redress for buying scabbed sheep.

Mr Smith, the defendant, said, I am a cattle dealer and a farmer at Frieston, near Boston. I had 500 sheep at Partney September fair. I bought 100 of Mr Briggs, 100 of Mr Oliver, near Spilsby, 80 of Mr Brumby, 70 of Mr Houlden, and some others were bought at Horncastle. I bought Mr Oliver's on the 25th August. They all were sent in one drove from Frieston to Partney. They were four days upon the road. If any of them had been affected with scab I should not have thought of taking them. I first sold at Partney 100 to Mr Charles Bramley; afterwards some to a gentleman near Peterborough; 204 to Mr King, the plaintiff; 50 to Mr Cole; and 80 to gentlemen who have been here to-day, but I did not know their names at the fair, as they paid in cash. I had no scabbed sheep that I knew of. I have sold sheep at Partney for many years, but never heard of the custom which has been spoken of to-day. I had some sheep at Horncastle fair after Partney, and finding there was something suspicious about them I took them out of the fair and sent them to London.

William Oliver said, I occupy a farm under Lord Willoughby d'Eresby at Eresby. I sold sheep to Mr Smith a short time before Partney fair. Neither they nor any of my flock had scab.

Mr David Martin, Mr Robert Martin, Mr Samuel Smeeton, Mr Longstaff, Mr William Everington, Mr David Briggs, Mr John Byron, Mr John Drury, Mr Charles Bramley, Mr Thomas Newton, Mr William Horry, Mr Henry Freshney, Mr Ashlin Cutforth, all respectable and well known as large buyers of sheep in the North Lincolnshire fairs and markets, corroborated the evidence of Mr Winder and the other witnesses for the defendant in denying the existence of the custom of which the witnesses for the plaintiff had spoken.

Mr Toynbee declined to call any further witnesses, although he had more than twenty upon his list.

This being the case, Mr Allison briefly replied.

His Honour put it to the jury whether they thought there was evidence of the custom?

The Jury: We are of opinion there is no such custom.

His Honour: The only question for you, gentlemen of the jury, now is, did Mr Smith sell these sheep to the plaintiff knowing at the time they were unsound? If you are of opinion that Mr Smith did not know the sheep were unsound, the verdict will be for the defendant. But if you are of opinion that he dealt unfairly with the plaintiff, and knew the sheep were diseased, your verdict will be for the plaintiff. I leave the case in your hands to say whether



Mr Smith has spoken the truth, and if not you will give such compensation to the plaintiff as you think proper.

The jury, after a short consultation, returned a verdict for the defendant.

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## MEETING OF A SOCIETY.

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### MEETING OF THE MEMBERS OF THE WILTS MUTUAL SHEEP ASSOCIATION.

(*From the Devizes and Wiltshire Gazette, Jan. 29.*)

ON Monday last, a meeting of the Association which was formed in this county on the 11th of September last, for the purpose of preventing the spread of that frightful disease in sheep, called "Small-pox," which was then, and had been for several months previously, committing its ravages in some of the finest flocks of Wiltshire, was held in the Town Hall, Devizes, for the purpose of determining whether the Association should continue, or whether—the time having arrived (the 11th of Jan.) up to which it was originally agreed by the rules that the members should be bound—it shall now be dissolved; and, if so, whether it should not, as a last act, adopt some decided means (either by memorial or by deputation) of bringing the frightful risks from disease to which the flock and stock masters of this country are exposed by the system of free trade, under the notice of Government.

The meeting was not very numerously attended—not so numerously as might have been expected, considering the importance of the question at issue; for the question which now demands attention is not so much one of *the past* (in which light we fear some flockmasters are disposed to view it—now that danger is not positively before their eyes), as one of caution for *the future*; and unless something be done to put a stop to the unlimited opportunities which exist for the introduction of foreign diseases, so sure as we had the small-pox in our flocks last year, so sure shall we have it again, and that in a still more aggravated form; for we have it, upon the authority of a Government Commissioner, appointed specially to inquire into the cause of diseases in English cattle, that nearly the whole of those diseases may be traced to the reckless way in which our import laws are carried out. The members of the Wilts Association, therefore, will be only putting a plaster over the wound that has been inflicted upon them, with the certainty almost of its breaking out with still greater virulence on a future occasion, if they rest content with what they have already done, and do not use their utmost endeavour to get the evil probed to its root. It is by doing this, and this only, that they will have any safety for the future; and as the matter is one in which the public generally are interested, we have little doubt about the issue; for we are much mistaken if even Mr Cobden, with all his free-trade predilections, will feel disposed to eat poisoned mutton and beef, with the sole view of enabling Dutch traders to get rich at the expense of the British farmer.

We regret, therefore, that the meeting was not larger, and that the Chairman of the Association (Mr George Brown), who has given so much attention to its affairs, and to the question especially under consideration, was prevented from being present, owing to illness. In Mr Brown's absence, Mr Wm. Sainsbury occupied the chair; and after a few preliminary matters had been talked over, and the minutes of former meetings read, Mr Norris (the hon. Secretary of the Association), read the following report:—

#### TO THE WILTS MUTUAL SHEEP ASSOCIATION.

*Report presented to the General Meeting of the Members, held at the Town Hall, Devizes, 26th January, 1863.*

The period having arrived up to which it was originally intended that the Wilts Mutual Sheep Association should continue, its members will naturally expect



from the Committee some report of the steps which have been taken to carry out the object for which the Association was formed, and of the disposal of the funds which were placed in its hands.

At the time the Association was called into existence, a disease called "small-pox," hitherto unknown in this county, was raging to a considerable extent among the flocks of Wiltshire; hundreds of sheep had already died in one flock in the immediate neighbourhood of Devizes, and the dangerous system of inoculation, which had been introduced among sheep hitherto unaffected, bid fair to propagate disease in all directions. The object of the Association—which was formed on the 11th of September last year—was, therefore, in the first place to prevent the spread of that malady by such unnatural means; and, in the next, by mutual combination, to afford compensation to those who might sustain losses from its attacks; and the Committee may congratulate the members generally that the prompt action which was taken to accomplish the first object was the means of preventing any necessity for the second.

An Order in Council had, it is true, been issued at the time the Association was formed with reference to infected districts, but this Order contained no prohibition against inoculation; and looking at the open area over which thousands of sheep in this country intermingle, it seemed next to impossible, unless some decided check were put to such a source of contagion, to prevent the communication of small-pox to a large portion of the flocks upon the Downs of Wiltshire. One of the first measures, therefore, adopted by your Association was to stop *at once* a resort to inoculation; to separate, bury, and destroy any sheep that might become infected; and thus exterminate *at the outset* all chance of contamination from infected animals. The result of this step, promptly taken, was, the Committee have reason to believe, the means of eradicating the disease from the immediate neighbourhood in which it originally broke out, and was the means of preserving thousands of others on all sides; and, as a consequence, the demand for compensation upon the funds of the Association has been, comparatively, *nil*, the Secretary having received claims from two infected flocks only, in one of which (a flock of 450) two cases only occurred, and these having been immediately separated from the rest of the flock effectually stayed the ravages of the malady.

Your Committee would, however, but imperfectly have discharged their duty had their attention been limited merely to the extinction of the disease where it was found to exist. They therefore put themselves into communication, through their Secretary, with several gentlemen in Norfolk who had had considerable experience of the small-pox of sheep, when that disease was imported into England some ten years ago, and, among others, with Mr Allan Ramsay, who was said to have tried, with success, the preventive effects of vaccination in several large flocks in that county.

The communications received from these gentlemen were of a very encouraging nature, and your Committee proceeded forthwith to put the matter to a practical test. With this object in view, your chairman (Mr George Brown) procured six healthy sheep from Mr Pritchard, of Longcot, near Swindon, and had them vaccinated by Mr Parker, a medical gentleman of Shrivenham. Having taken the vaccine satisfactorily, two of these sheep were, on the 9th of October, forwarded to Mr Church, at Aldbourne, where they were placed with two very bad cases of small-pox, so bad that the animals afterwards died in a most loathsome state of disease; the vaccinated sheep, however, appeared in no way affected, and on the 29th they were removed to Mr Hulbert's flock at Langley, where small-pox was raging in its most virulent form, and where, it should be stated, the four other vaccinated sheep had been previously sent on the 23rd of October. Here the six vaccinated sheep remained until the 3rd of November, mingling with a mass of diseased sheep, resisting all contagion, and continuing all of them in a perfectly healthy state.

But Mr Brown determined to put the experiment to the most extreme test; and on the 3rd of November he accompanied Mr Parker to Mr Hulbert's, and there had the six sheep inoculated. That there might be no question about the matter, each sheep was inoculated in two places, and on the following week there



was strong evidence of their having all taken the disease; indeed the fact was soon placed beyond doubt, for on the 13th one of them died in a very bad state, followed by the death of another on the 19th, two more being at the same time exceedingly ill, with pustules fully out; but the remaining two appeared little affected, and, with the other two, have since quite recovered.

It will be observed, therefore, that up to the time of inoculation—during the 25 days that a portion of the vaccinated sheep were exposed to the small-pox in its most virulent form—the resisting effect of the vaccine was complete. How far the six sheep might have continued to escape contagion it is impossible to say; and your Committee cannot but regret that the severe experiment of inoculation was not limited to three of the sheep only, leaving the other three to test the permanent effect of vaccination. The experiment has, however, exemplified one result, that inoculation is not always certain to produce the disease in a mild form, two of the sheep thus artificially impregnated with the virus having died in a shocking state; and in Mr Hulbert's flock the losses were greater, by about 14 per cent., among the inoculated cases than in the natural ones.

Another good result has also, in the opinion of your Committee, been satisfactorily established, viz., that separation, and not inoculation, is the proper mode of dealing with affected cases; for in *every* instance which has come within the knowledge of your Committee, and there were many, where separation was practised at the outbreak of the disease, its effects were confined to those animals only first affected in each flock, and these having been removed from the others, in no single case did the disease extend further; whereas, in *all* cases where inoculation was practised, the disease has been extended, and its virulence and fatality have been as great, and in some instances greater, than where it was allowed to wear itself out naturally.

So far your Committee have endeavoured to fulfil some of the objects for which the Association was formed; but they feel that the Association would have existed to little purpose if it allowed its members to separate without urging upon the Government the positive necessity of adopting a more strict supervision of the Import Laws. It is to the reckless importation of diseased foreign animals, under the guise of "Free Trade," that the immense losses to which the stock and flockmasters of Great Britain have been subjected since the year 1842, are directly traceable, and to which your Committee cannot but ascribe the direful malady which was the means of bringing this Association into existence. They are credibly informed that the Privy Council are at this moment in possession of such a mass of facts condemnatory of the present system of importation as will render it almost impossible to resist an appeal to prompt action—facts which show that there has, throughout the past year, been a continuous transit of foreign animals from the most diseased districts of Holland, Germany, Prussia, and Hanover, into the various ports of disembarkation in this country: and further, that in March and April last, just prior to the appearance of small-pox in our English flocks, there was a large importation into London of sheep known to have been drawn not only from infected *districts*, but from infected flocks.

Your Committee trusts, therefore, that the Association will not allow the opportunity of its meeting on this occasion to pass without adopting a Memorial to Government, asking that greater vigilance may be exercised, than now prevails, to check the risks to which the farmers of England are at present exposed; that they will ask for the publication of the reports of their own officials, now in the possession of the Privy Council—reports which, if the Committee mistake not, will shew that since 1842 the diseases of cattle in this country have risen from 1  $\frac{1}{4}$  to a common yearly average of 5, 6, and 10 per cent. Nay, "farmers may open their ears (says a Government Commissioner in a recent publication) when I tell them that last year we did not lose, in England alone, less than three times the total amount of cattle we imported, and if we calculate the loss over the three kingdoms, it will be found that, *for every animal we purchased from foreign dealers, we did not lose less than 6 or 7 of our own!!!*"

Surely it can form no part of a proper commerce, that our stock should be destroyed by the very animals we admit to compete with us in our markets! The



matter is indeed one of the deepest importance, not merely to the members of this Association, but to the public generally, and your Committee feel that they would but imperfectly have discharged their duty if they did not urge it strongly upon the consideration of the present meeting. They might well ask if it be free trade to contaminate the country with pestilence, to poison the very meat we eat, and to rob the English farmers of thousands, by diseases which, prior to 1842, were hardly known in this country?

It only remains, however, now for your Committee to resign the trust reposed in them by the members of this Association, and in conclusion to express their warmest thanks to Mr George Brown, the chairman, for the time, and trouble, and exertion he has devoted to this, as, is his invariable practice, to every other object in which the interest of the farmers in Wiltshire is involved; they feel that but for the personal attention and energy which Mr Brown has given to all matters connected with the Association, much valuable information would have been lost; and they are persuaded that they only echo the unanimous voice of the members when they thank him heartily for the prominent part he has taken in endeavouring to carry into effect the objects for which the Wilts Mutual Sheep Association was called into existence.

H. KENT NORRIS, *Secretary*.

The financial statement (which was also read by the Secretary) shewed a balance in hand (after every expense has been met) of about L.2. This statement, however, included no acknowledgment of the services of the Secretary, which have been considerable, both as regards time and trouble. It was agreed, therefore, to make a call of 5s. from each insuring member, which would produce L.22 10s., and (as the Chairman observed) enable the Association, if not to remunerate, at least to recognize in a small degree a very zealous and able friend.

The SECRETARY said he had undertaken the duties of the Secretaryship, with which they were pleased to honour him, with no view to payment. He had not expected anything, nor did he desire it; but he was nevertheless flattered by the assurance that his services were appreciated by those whom it had always been his pleasure and his desire to serve—viz., the farmers of Wiltshire.

The CHAIRMAN and Mr KING (of Everley) both remarked upon the ability with which the report had been drawn up. They regarded it not only as a truthful epitome of the operations of the society, but as a valuable document, which they should like to see extensively circulated.

Mr R. C. LONG proposed that it be adopted by the meeting, and that a memorial founded upon the remarks contained in the latter portion of it, be prepared by the Secretary, signed by the Chairman on behalf of the Association, and presented to the Secretary of State.

This proposition was seconded by Mr King, and unanimously agreed to.

The next question was whether the Association should be continued? The Secretary reminded the meeting that in accordance with one of their rules, no member was bound by it beyond the 11th of this month. Was it their wish that this rule should be put in force, and that the Association should be broken up?

Mr KING—Are we sufficiently represented here to decide the question?

The Chairman said, as the Secretary would have to send a circular to each member, and as it would be necessary that they should have another meeting for the purpose of winding up the accounts, it would be advisable perhaps to leave the matter open until that day.

The SECRETARY—What seems to be the general impression of the gentlemen present? This meeting has been convened, as you are aware, for the consideration of the question, and it is desirable therefore that those who are present should at all events express their opinion, especially as we are not likely to get a larger muster at an adjourned meeting.

Mr KING—Would you, in the event of the Association going on, continue the same rules, and proceed upon the same basis as at present?

The SECRETARY said it had not been suggested that there should be any substantial alteration in the rules.



Mr LONG—I think the Association very useful; and I should be for continuing it. Still I am only one among the members of which it is composed.

Mr KING—Would it not be well, as the Secretary is going to send out circulars, to ask each member to give his opinion, and leave any decision upon the matter until the next meeting?

Mr LONG thought this would perhaps be the best course to take, as they were comparatively but a small meeting; and said he hoped it would be borne in mind that independently of its enabling them to insure against losses, an Association of this kind was of great good in other ways.

Mr KING thought the Society might be made more general; that it should not be confined to compensation for losses sustained by the special disease which had called it into existence, but to other diseases which had been alluded to in the report, and which it was exceedingly desirable they should be enabled to protect themselves against. He repeated that the report was a very valuable document; it afforded a great amount of information, and displayed much ability on the part of their Secretary, and he had little doubt that if a copy of it were forwarded to the Bath and West of England Society they would be pleased to place it in their journal. He did not know what the Royal Society might be disposed to do.

The CHAIRMAN—The Royal Society seem to have treated the matter rather coolly.

The SECRETARY—Yet it is a matter involved in more serious consequences to the agriculturists of this country than any that has been mooted within my experience. Why the Royal Society, on receiving two applications from this Association, should have taken no notice whatever of the first, and have merely answered the second by a formal printed acknowledgment, I do not know; but this I will say, that if the Royal Society exists for no other purpose than that of discouraging local Societies having for their object the protection and general welfare of the practical farmer, the sooner it adopts new rules the better. If its only purpose is to promote the exhibition of stock and implements, it is, to say the least of it, a very secondary object in comparison with that which this Association has in view.

After some further conversation, it was agreed that copies of the report should be sent to the Marquis of Ailesbury, and Mr Darby Griffith, M.P., and to each of the members of the Association.

In closing the proceedings the CHAIRMAN (Mr W. Sainsbury) said he was sure every one present must regret the absence of Mr Geo. Brown, and especially the cause which compelled it. He knew no agriculturist in this county who was more looked up to and more respected than Mr Geo. Brown, and no one could have carried out the views of the Association better than Mr Brown had done. He only hoped that the illness from which he was now suffering would be but temporary, and that it would not be long before they should see him among them again. He could not however allow the meeting to separate without saying how highly he appreciated the services which had been rendered them by their able Secretary, and especially thanking him for the admirable report which he had prepared. It was a report which, in his opinion, ought to be in the hands of every agriculturist in the kingdom, and he believed (with Mr King) that the Bath and West of England Society would be only too happy to record a copy of it in their journals.

Mr NORRIS said it had been his pleasure on many occasions to be associated with his friend, Mr Geo. Brown, in matters of interest to the farmers generally, and he most cordially and sincerely appreciated the expression of the Chairman with regard to the cause of Mr Brown's absence on this occasion, and with the hope that it would not be long before they should see him among them again. On Mr Brown's behalf he begged to thank them; and for himself, he would add, that he felt very much obliged to them. This was not the first time he had been placed in the proud and flattering position of acknowledging an expression of kind sentiment on the part of the farmers of Wiltshire towards himself. His great desire on all occasions had been to do his duty to the best of his ability. This, he believed, had brought around him the large number of kind and influential friends whose good opinion it was his privilege to possess, and it would, he hoped, be the means of extending those gratifying influences to a still wider circle.



## PERISCOPE.

### DISEASE AMONG SHEEP IN CUMBERLAND.

WE regret much to state that the rot is now very prevalent amongst the sheep in this county. From all places where a redundancy of moisture impoverishes the land, whether on those high districts which are wholly pastoral, or in more genial localities where the plough partly holds sway, our information all tends in one direction—to show that there has been an extraordinary number of deaths amongst the woolly tribe. And, indeed, from dry luxuriant vales, amidst fertile soil which produces abundant crops, there has been a considerable loss reported. In the last case the stock has been tainted before being imported from its native hills, and the mild wet winter has hastened on the disease with great rapidity. We are assured that, in many instances where small farmers purchased in the autumn twenty, thirty, or forty lambs, for the purpose of wintering them and then disposing of them in spring, one moiety of the flock has died, and on some farms the whole lot has been exterminated. The diminution will doubtless have the effect of making hoggs very scarce and dear for some time to come, in addition to other seasons such as the high price of wool and mutton which will cause sheep to be much in demand. The unhealthy condition is undoubtedly owing to the immoderate rains which we have experienced during the past twelve months. The summer, it will be remembered, was characterized by an excess of humidity, and an utter absence of that genial warmth so beneficent to both animal and vegetable life. Then followed a mild winter, bearing in its train boisterous winds and heavy prolonged rains—a course admirably adapted to foster and fully develop that incurable malady. We say incurable, because it is generally admitted by graziers, that when an animal once becomes affected with the rot—when the flukes once manifest themselves in the liver—the complaint may for a while be partially arrested in its early stages by a judicious mode of treatment, but it can never be eradicated. It behoves all, then, who have fallen under the ban of this epidemic, to make their stock ready for the butcher as fast as possible—and, in the case of a breeding flock, to sustain the mother by all means which science and practice can suggest until the offspring can live without the aid of maternal care. The prevalence of rot was the cause of an action in the Brampton County Court on the 13th inst. The plaintiff, a sheep and cattle dealer in this city sued the defendant, a farmer near Brampton, for loss sustained by reason of 70 blackfaced ewes not being sound, as warranted by defendant at the time of sale. After the ewes had been duly delivered to the plaintiff or his agents, and taken by him to Yorkshire, thence brought back to this county, the whole of them, as proved on the trial, turned out to be rotten, and died. Defendant denied having warranted them, but the judge ultimately gave a verdict for the plaintiff for the full amount claimed—£39, 2s. The decision in this case will have the effect of making every one cautious in the sale or purchase of sheep. Flocks that are tainted may to all outward appearance be perfectly right and sound; but take them from their native pastures, drive them or even truck them from one fair to another, knock them about, give them either bad or insufficient food, and they will soon droop, pine, and die. But, in addition to the rot, a large section of the sheep in Cumberland have been subject to another distemper during the past year. The murrain, or foot-and-mouth epidemic, has prevailed amongst not only our flocks, but herds of cattle, also with a virulence which fortunately has seldom been witnessed. Although seldom, if ever, proving fatal, it inflicts great injury upon lean and more particularly fat stock when it appears in an aggravated form. Fat sheep rapidly lose flesh when under its influence, and, if not of a sound constitution, rarely shake off its effects before being consigned to the butcher. Farmers, therefore have had many cogent reasons for lamenting the unfavourable summer and winter besides suffering from inferior crops. The great price of lean stock, the scarcity and enhanced



value of turnips, diseases, a dank, unpropitious season, have all militated, notwithstanding the high quotations of both wool and mutton, against a numerous class of feeders, and will reduce their profits to a minimum, and perhaps in too many instances cause a balance on the wrong side of the account.—*Carlisle Journal*.

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### THE BATTERSEA SHOW—STOCK DEPARTMENT.

(*From the North British Agriculturist.*)

A STRANGER to English agricultural exhibitions upon his arrival in London from the Continent, hastened to Battersea showyard, and as he surveyed the animals in the rows of canvas shedding, felt at first greatly surprised at the state of obesity of the stock competing for the prizes offered for breeding animals. After a closer inspection, he came to the conclusion that one of the conditions imposed upon the exhibitors was, that the animals competing for the prizes must be shown in a state of fatness rendering them suitable for the abattoir, and that the jurors appointed to adjudicate took obesity into consideration, as well as symmetry, purity of breeding, &c. The foreigner having discovered, as he imagined, a key to the solution of the problem, felt satisfied that he now fully comprehended not only the cause of the extraordinary fatness of the animals, but the wisdom which guided the deliberations of the Council of the Society—that as the animals were ultimately destined for the shambles, their qualities as beef-producers could only be ascertained by showing them in a state of morbid fatness. Having expressed to a friend his satisfaction at the sight of so many magnificent animals brought forward in such a perfect state of fatness, he was amazed on learning that the Society discouraged overfeeding, and that in some of the classes judges had passed over animals chiefly on the ground that they were injured for breeding purposes by their state of obesity.

What this highly intelligent foreigner observed, applies to almost every Show of stock in the United Kingdom—overfeeding being the rule alike as regards cattle, sheep, pigs, and horses. At Battersea, the horses of heavy breeds, especially the Suffolks, were so loaded with fat, that an advocate for the legalising of the sale of horse flesh had good opportunity of dilating on the beef-producing properties of some of our English breeds of horses. To practical agriculturists, the evils of this system are well known. Even the prize tups of local shows are often rendered useless for procreating purposes, and consequently a source of disappointment and loss to those who have hired them. The reasons why this overfeeding of stock is continued in spite of such disadvantages are generally understood; but though the evils are recognised, no plan has hitherto been devised which can be satisfactorily carried out in the showyard. The system thus continues, and the best animals of the best herds of the various breeds are in many cases sacrificed to a system with which the most intelligent exhibitors and owners of stock are themselves dissatisfied.

But the evils of the practice are not confined to these direct results. The prevalence of contagious diseases in the bovine and ovine races is another and even more powerful argument against the exhibitions of stock. Such diseases have of late years greatly increased, and are now regarded by many as one of the most serious contingencies in stock husbandry. Murrain and pleuro-pneumonia have within the last twenty years caused a greater amount of loss of cattle and sheep than the whole imports of foreign live stock into this country. This we have frequently asserted, and further inquiry tends to confirm the correctness of the previous statements. It is impossible, therefore, to consider the expediency of agricultural exhibitions without regarding the change which has been thus produced. At Battersea, for instance, though the stock were apparently all healthy on entering the showyard, it is known that in several cases symptoms of murrain appeared; and from the showyard the disease was conveyed to herds in which much injury was subsequently sustained. Not only so, but in the showyard itself the dangers of contagion were partially ex-



perienced. An empty stall or two was remarked upon by some, and those who looked into the hospital found the animals which had been removed under the authority of the veterinary inspector labouring under murrain. A day or two after the close of the exhibition, a very valuable shorthorn bull, grandsire of the gold medal bull—died of murrain; and the third prize cow of the same breed, and belonging to the same owner—the late Jonas Webb—also died under the care of Professor Simonds. Other cows also died from the disease, and bulls, purchased for the continent never reached their destination, having succumbed to murrain before being shipped. As breeders generally are extremely anxious to conceal such unfortunate results, only a portion of the loss of animals from murrain at Battersea will be known to the public. Though the Battersea exhibition is the most recent example of the injurious results of the congregating of valuable animals in a showyard, those conversant with the history of national shows know that such results are almost invariably presented, and indeed may be regarded as one of the conditions of such exhibitions.

With the existence of such formidable maladies as murrain and pleuro-pneumonia, and with their extension so greatly due to public markets and agricultural shows, it is a question of national importance how far exhibitions are expedient, and whether they ought to be continued. Admitting that a show of stock is a school for educating the agricultural mind—presenting some of the best specimens of the respective breeds, and showing prominently the qualities which render such breeds valuable—the advantages accruing from showyards are surely dearly bought by the sacrifice of many of the best animals for breeding purposes by the system of over-feeding, by subjecting those animals to contagious diseases in the yard or on the journey, and by the conveying to herds, and from these herds sometimes over a district, contagious diseases. The practice of entering superior animals for several shows—these animals going the show-circuit, as it may be called—increases the probabilities of the animals becoming diseased, and of being the means of propagating the malady by which they may have become affected. Some experienced exhibitors place the show animals on their return from shows under a sort of quarantine, and they are so kept after the close of the show season till all danger of contagion has ceased. For some years there has been a general desire to form county or district associations, and with the view of getting up attractive shows, the competition is in some of the classes open to all, irrespective of membership. This necessarily increases the risk of the spread of contagious diseases. Government has lately shown great anxiety as to the spread of small-pox in sheep, which had suddenly appeared in a flock in Wiltshire in autumn; but the equally serious evils arising from the presence of pleuro-pneumonia among the bovine race have not had sufficient general attention, and scarcely any official notice given to them. Some believe that the Government had equally valid reasons for the adoption of stringent measures to prevent the spread of pleuro-pneumonia; but whether the Government interferes or not, it is certainly the duty of Agricultural Societies to consider this subject in relation to their exhibitions, and also the duty of leading exhibitors who are impressed with the risks they submit to under present circumstances to bring the subject formally under the notice of the managers of these societies. But whether the breeders of high-bred stock adopt this course or not, it is a duty which agriculturists owe to themselves, as breeders and feeders of stock, to consider whether or not agricultural exhibitions under present circumstances are not calculated seriously to militate against their interests by the propagation of contagious diseases. The question is not confined to mere exhibitors; as the entire body of agriculturists are sufferers under a system which gives facilities for the spread of diseases, the ravages of which have in many cases rendered the breeding of valuable animals a hazardous speculation.



## THE DISEASE IN SHEEP AND CATTLE.

*(From the same.)*

WE very much regret to state that the disease of "rot" or "bane," which has for many years past prevailed amongst the flocks and herds in Gloucestershire, owing to the wetness of the season, has again manifested itself to a very alarming extent, more so than it has ever before. This is owing to the very great quantity of rain which has fallen, there having been scarcely two consecutive days unaccompanied by rain. The effect of these rains has been most severely felt in the low districts, and more especially on the borders of the Severn. On these lands it is stated that there are few sheep which have entirely escaped the disease. Within the last week or two the disease has shown itself to the worst extent, and it now assumes a very serious aspect. To large flockmasters it is a matter of the greatest import, and the losses they have experienced are very heavy, as a great number of their flocks have been lost by the disease. Even when the disease does not prove fatal, the loss is great, as the animals suffering from the complaint are very much reduced, and it requires a considerable time to enable them to regain their original state. We have heard that at the country markets which have been held during the last month the supply of sheep has been very small, not near equal to the demand, and that those brought have not been of such a description as is usually offered; indeed, butchers and dealers have to exercise great judgment in making their purchases, as, notwithstanding a flock of sheep may, to all appearance, look healthy, they are oftentimes infected by the disease. This disease has, during the last few years, been so prevalent, that it has proved a very great loss to flockmasters, which accounts for the scarcity of mutton and the high price at which it is selling. The continuous rains of the present season have also had an ill effect on the young cow stock generally; they have been more or less affected, though in this case we never heard of any serious loss.

## THE APPROACHING LAMBING SEASON.

THERE is something so annoying and trying to find that, after all we have done to make any department of business prosperous, any failure should occur from some forgotten or unforeseen cause. This is not unfrequently the case with the flock of ewes in the lambing season. The great thing is to have the ewes in that particular state and condition so requisite to ensure a successful issue. They should be wintered in a generous and equable manner. Their pastures should be good, and adventitious aids should be given as they are becoming heavy with lamb, but with great care and judgment. On no account must they be kept too highly, and it is equally dangerous to keep them badly. They want to be kept in that way which, whilst it upholds their condition, shall not render them liable to fevers or inflammatory tendencies. If too "fresh," they will be in danger of high fevers; if too "poor," of low or typhus fevers. If their artificial food should consist of beans, pease, or barley, they will suffer from inflammation either in their general frame, or those particular parts most likely to suffer injury from lambing. Oats, oat-chaff, turnips, mangolds, or swedes may be given freely; cabbages are too flatulent. Even the above should be given with great caution, and with much regularity. They cannot be kept and managed too quietly; nothing should be allowed to disturb them. As the lambing season approaches, it is very dangerous for them to leap over grips, or to gallop across the field, or to be subject to any sudden alarm, which might cause the displacement of the lamb in the womb.

The ordinary management of the ewes during the lambing season is patent enough to every experienced shepherd, and under such care in average seasons no great loss ensues. The great difficulty lies in bringing the flock safely and favourably through in precarious, very cold, and changeable weather. It



is not many years since that we had a severe and long-continued snow-storm. It lasted several days; the snow on the writer's farm would average a depth of ten inches. Every attention and care was taken at the time. Fold-yards were appropriated, hovels of all sizes were cleared and littered, paddocks received additional shelter, and pens innumerable (almost) were provided; the best of food was given, and plenty of help always at hand. Yet, notwithstanding all this, upwards of forty ewes were "storm-struck" and died, and many others lost the use of their limbs for a time, and some irretrievably. The ewe flock would number about 260; so that the comparative loss of ewes was very great, besides an indefinite number of lambs which died or lost the use of their limbs. I hope never to see another season like that. But I have experienced several very nearly approximating to it; and, as we have had so little wintry weather this year, it may come yet. My advice is, by all means prepare for it, and let nothing be lost through such neglect or indifference. The shepherd should make every provision for the safety of his flock ere the lambing season actually begins. His lambing paddock should be provided with plenty of pens and covered shelters. The common sheep hurdle wattled with straw is as good and cheap a protection as may be. Five of these will make two commodious pens—three being set parallel, another to form the back, and a front one for the gate, and for a covered shelter a sixth must be secured across the top. A number of these pens should also be set about the field where the ewes are during the day, for their use in wet or stormy weather. On a fine day the lambs just lambed are best left out with the ewe in the open field; they soon become hardy after a good suckling. His own "outfit" should consist of the following, and for these specific uses—*i. e.*, a crook of considerable length in the staff, so as more readily to catch a ewe; a basket and rug, in which to place a starved lamb for removal to a fire—these often die in the removal when exposed in the customary manner, by being carried dangling by the forelegs; the breathing under the rug will frequently restore them—a small bottle of gin, to give a small teaspoonful to a starving lamb; a bottle of warm milk, to give to a lamb whose dam cannot support it; a phial of brandy and sweet spirit of nitre, equal parts, to give a dose or tablespoonful to an exhausted ewe after lambing, to be repeated if required; a phial of laudanum, to give a tablespoonful to a ewe after a severe and protracted labour where symptoms of paining appear likely to succeed; a cord, to tie the foot of a lamb when the shepherd is compelled to take it away by the introduction of his hand into the vagina—he has often in such cases of wrong presentation to push the lamb back to turn it, the cord is then useful to put on the leg to draw by—a hook or curved wire, similar to a button-hook, to take away a dead lamb or portions of a remaining placenta; a knife with a round-ended blade, to be used, if needed, in taking away a lamb piecemeal, when such desperate cases occur; a marker or a piece of ruddle, to mark the lambs as may be desirable—*i. e.*, the twins of a ewe, or to denote the sire or a particular dam. He ought also to be provided with castor oil, Epsom salts, ginger, oatmeal, and treacle—the first to be used as medicine in cases of fever, the latter for gruels and cordials. He should also have a little soft soap and diachylon plaster for bad udders; the first to wash and supple it, the latter for softening and healing.

The flock should be collected in the lambing field, and be regularly fed with their usual food (no changes). On every cold or dark night they should be brought into the lambing paddocks. The shepherd should never be absent above three hours at one time. He should most diligently watch every symptom of uneasiness in any of his flock; when labour has reasonably advanced, he should carefully catch the ewe, and with his finger ascertain that the presentation is right—*i. e.*, the muzzle first, and the two fore feet close on either side of it—he may then with confidence leave the ewe to her own natural efforts. If, however, the labour is protracted, he must again catch her, and render such aid as in his judgment she requires. It is proper to lay her on her right side. If the lamb requires taking away (and this may easily be ascertained by the protruding tongue or swelling muzzle), he must pull one leg forward first, then the other, and at the same time try to bring the head out too. If the ewe has forced out



head, and the lamb is retained by its shoulders, no time must be lost, or it will soon be dead. As soon as the lamb is brought forth, its muzzle and mouth must be cleansed, then laid to the dam's head for a short time for her to lick. In a few minutes it should be suckled. This is often a painful operation for the poor ewe; many foolish shepherds will, immediately the ewe has lambed, raise her on to her rump, and, regardless of her paining, try and coax the lamb to suck. It is better to wait awhile in most cases. The ewe requires ease and rest more than the lamb his milk—few shepherds give this rest. If the lamb can be coaxed to suck as the ewe lies on her side, no hurt is given to her. This ought to be attended to invariably. In all cases of wrong presentation, the shepherd must have help to hold the ewe properly.

In cases of rump presentations, the lamb must be pushed back, and the legs, if possible, be brought forward, and the lamb may thus be taken away; but in all other cases it is best to turn the lamb in the womb. Should the womb protrude, or be forced out by paining, and become inflamed, it is best to tie a cord tight round it, so that it is made to slough off. The ewe is much more likely to be thus saved than by returning it to its place.—“*Practical Farmer*,” in *Mark Lane Express*.

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#### ON THE QUESTION—MAY THE FLESH OF CATTLE INFECTED WITH PULMONARY DISEASE UNDER CERTAIN CONDITIONS PROMOTE THE PROPAGATION OF PULMONARY DISEASE? OR IS ANY SUCH ATTRIBUTE NOT TO BE ASCRIBED TO IT?

As hitherto, rationally instructed, practical veterinary surgeons, who alone are sufficiently competent judges, characterise pulmonary disease as a contagious affection throughout all its stages, and that, even for a considerable time after its abatement. The question arises, What material in or from cattle affected by pulmonary disease has the power of reproducing this malady among animals of a similar species.

The examination of the contagious tendency of pulmonary disease by means of careful observations throughout several decades in all civilized lands of Europe, determines the exhalations from the lungs, the mucus from the nose, the fæces, and the urine, as conveyers both of the volatile and fixed contagious matter; and although these, in the establishment of this view of their power, were only too frequently misunderstood by the physicians, who are the recognized authorities on such subjects, yet the facts ascertained concerning them being apparent, they forced themselves of necessity upon the attention of Government. The consequence of this was, the appearance of regulations which, although not less than adequate to the restraining of the propagation of the disease, yet aided the recognition of the fact, and thus assisted in inaugurating precautionary measures.

Besides the exhalations of the lungs, the mucus from the nose, the newly passed fæces and urine, and the hide, the present writer, from personal observations during several wide-spread and devastating endemic attacks of pulmonary disease, and especially of the attack that raged from 1st September 1859 to the middle of June 1860, in the Bavarian town of S., in the district of T., came to the conclusion that flesh also in different stages of the disease, under certain conditions, stated below, was an active agent in promoting the propagation of contagion; wherefore, according to this proposed opinion, this question may be brought more directly under our deliberation.

If it admits of no further doubt that the breath exhaled, and the secretions and excretions of the animals affected by pulmonary disease, and in a wider sense the very localities in which they have been stalled, offer occasion for the propagation of disease, so consequently must this opinion refer also to the flesh and the blood of infected animals. Or is it perhaps the nutritive principle which permeates every molecule of the body and nourishes it—though perhaps it is not yet impregnated with the local disease in the animal affected by pulmonary



disease—that makes the embryos of the diseased mothers partakers of that disease?

The present writer does not mean to assert, on the ground of anatomico-physiological and pathological evidence, that, on the one hand, the *flesh* of animals affected with pulmonary disease, which is never quite free from blood, can accomplish this after the throat has been cut, on the other hand, to have gone to work to clean, &c., without the prudence necessary for the saving of life in an atmosphere of the kind referred to, or with unclean implements, is sure to be followed by contagion, however much one may try to preserve the healthy cattle.

And how frequently is the killing of diseased animals undertaken and executed with an unpardonable negligence as to the blood, the hide, the contents of the stomach, the windpipe, &c. I saw, for instance, the blood cast out upon a dung-hill, or into the stream, the hide left for a considerable time in the fodder-loft, the contents of the stomach and the bowels, either thrown into the flowing stream or left uncovered on the dunghill, the washings of the washed flesh either accidentally or intentionally offered by the servants to the cattle with other ingredients to be drank; conditions which, not to speak of the spreading abroad of the suspicion of contagion, creates, in fact, the disease.

How comes it then that men of the profession, who have written on the subjects of the pulmonary disease, do not also speak of the spread of the disease through cattle killed in sickness, and by means of flesh and blood designed for the use of man? Why have they not, during the prevalence of disease, emphatically demanded the covering with earth of the dung brought from the infected stalls, the careful conveyance of the hides to the tanneries, the thorough disinfection of infected stalls after the abatement of the disease, the scrupulously careful removal of healthy cattle, and the properly deep burial of the infected in an unfrequented place.

Nearly throughout the whole country an old custom exists, which prevails on the occasion of the necessary killing of cattle, especially when that is the result of pulmonary disease, the inhabitants of a village, on which the calamity has fallen, are allowed to carry off the flesh at a cheap rate, especially when the malady is of long duration and of wide-spread dimensions. By this means portions of flesh are conveyed into various districts not yet reached by the disease, and the contagion transplanted therewith.

Were the killing of cattle affected with pulmonary disease, and the distribution of the flesh managed with prudence, especially at the beginning of the outbreak of disease, only the most limited possible amount of contagion would be to be feared. While, however, in this respect much remains to be desired, it must nevertheless be considered as a necessity that the export of infected flesh in a pastoral country, where, in almost every house, the breeding of cattle is carried on, is to be accounted among those causes which, according to experience, promote the propagation of disease.

In the year 1859, the often-thought-of disease broke out in S., by means of imported cattle, and the contagion had been introduced a half-year before the veterinary surgeons of the district were aware of its existence. Some infected cattle were killed, and the flesh publicly sold off with the consent of the empirical flesh-supervisor appointed for the suspected district, (who either did not know the conditions of the disease, or for good reasons did not wish to know, in short, omitted to lodge information of the affair at the court. Cleanliness was at the same time neglected. They threw blood and the contents of the stomach and viscera on the dunghills, without covering them with refuse or earth; cast pieces of the lights into the stream that flowed through the village; placed pieces of the purchased flesh before cats and dogs, that devoured them in the stalls or in hay-lofts, and so forth. The disease thus continually spread itself wider, although neither intercourse in the field nor any other communication between the cattle of the district had taken place. Then suspicion was aroused,—certainly satisfactory evidence of the propagation of disease, by means of clearly indicated agencies, had been presented so emphatically, that the co-operation of any other cause of disease was not thought of; moreover, this wide-spread calamity made so deep



an impression on the inhabitants of the district that, from that time forth, not a single pound of the flesh of diseased cattle could be disposed of. For a long time one could not at all rightly explain how this disease could break out in a stall situated at such an unusual distance from the infected stalls, although one did not reflect on the original development of the disease, nor on the conveyance of contagion, which is always possible; nor on how disadvantageously the veterinary surgeon, superintending the disease, must have been effected, in so far as he must have remained responsible for a clear explanation of this matter to his superiors, while, but for him, further light might have been thrown on the subject in certain cases, according to the notices quoted above.

What the author of the present article has declared in his work on the pulmonary disease, in the year 1856 (page 19), he is now again compelled to assert, namely, that the spontaneous development of the same, always only on one hand in a single stall, as well as its development on the pasture in the middle of a herd of cattle, on the ground of an earlier and more fully recognised visitation, may appear at a moment of time not yet sufficiently ascertained,—but will not appear at the same time both epidemic and endemic,—that further, contagion, by means above indicated, is created from that first case of pulmonary disease in the course of the sickness, and that, under certain favourable circumstances, the sickness is intensified until it rises to the rank of an actual endemic.

After this explanation, what duty falls to each communal government. Certainly to take every individual parishioner on the frontiers to the first suspected case of supposed disease that appears, in order that he may know immediately, on the outbreak of the same, the necessary steps for the prevention of its propagation. This duty demands no less than the lodging of information with the shortest possible delay at police courts.

However, from the stand-point of the communities, in order to be able to satisfy governments with regard to this, the popular instruction of the cattle breeders of the country, in the symptoms, the malignity, the contagion, &c., of this disease by means of local newspapers, district meetings, &c., is a pressing need; equally as pressingly important is an order,—issued from the highest authority, comprehensive and according to the spirit of the age,—making declaration of diseases.

But, lastly, the diseases of animals require also, for their proper treatment, experienced, and, moreover, untiringly industrious veterinary surgeons, but who also, as police-veterinary-surgeon in their frequently extremely difficult position, require to become the best possible props of the provincial courts. In those countries, however, where they are not yet emancipated, that is, where independence cannot be obtained at the time, one is certainly willing to relieve them once more from the position, so unnatural and not seldom so impeding under physicians who are not veterinary surgeons. Thus independently placed, the veterinary surgeons would be in a position to speak out what is necessary against the district courts and the governments, relating to their sphere of labour amongst disease; to speak and to publish propositions for this purpose, and, finally, still petitioning against mismanagement and prejudice, to pray for their abolition respectively.

In conclusion, however, readers are not to complain of the departure from the proper theme in the last statements of the present essay, and, lastly, he desires, in the interest not only of knowledge itself, but also in the interest of the public, to place the explanation of the question at the head of this paper before a critic who will advance it.

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#### REMARKS BY DR BALFOUR ON TWO CASES OF MURRAIN IN MAN.

(From the *Edinburgh Medical Journal*.)

THESE two cases seem to me to possess very considerable interest both for the profession and general public. They present two well-marked instances of the occurrence in man of a loathsome, at least, if not always very fatal epizootic disease, in which the influence of contagion has been distinctly traced by an independent



medical observer, who was previously entirely ignorant of the possibility of such an occurrence, and whose observations are therefore all the more valuable as the results of unbiassed inquiry, while they entirely corroborate the earlier investigations of continental medical men, and the more recent observations of veterinarians in this country, as I shall presently point out.

The word MURRAIN is of doubtful origin and of still more doubtful significance, —perhaps its earliest appearance is in 1389 (Anno xi. regni Ricardi II.) in its Latinized form: “*Murrena* damarum ferarum.”<sup>1</sup> And in the Twysden Glossarum, we have this explanation given,—“*Murrena*: lues, tabifica lues, vulgo, *Murraine*; a graeco *μαραινω*, i.e., tabefacio, ut Casaubonus jam observavit.” Haesinger<sup>2</sup> prefers to derive it from the Sanscrit root *mr*, whence the Latin *moiri* and the Celtic *muire*, etc. While considering the multiplicity of the significations attached to the word, a good deal might be said in favour of its derivation from the good old word *murr*, meaning coryza, and obviously derived from *μυρω*, to drop, to distil. To myself the latter derivation, which is original, or that of Twysden, appears to be much the most likely, while Haesinger’s is obviously far-fetched, and apparently based upon the Septuagint version of the word murrain in Exodus ix. 3, which is *θανατος* in the version of Lambertus Bos (Franequaræ, 1709), the Oxford manuscript quoted by him *in loco* reads *Δοιμος*, one of the words employed by Thucydides in his history of the Athenian plague (ii. 54); while the original Hebrew (of Michaelis—Halæ, Magdeburgicæ, 1720), *דבר*, does not countenance any of these suppositions, as the primary notion of this root is *agere* or *ducere*; and from it we have, through the Gothic *dreiban*, the English word *drive*, a pestilence, because it drives men (or animals, as in this instance) to their graves.<sup>3</sup> But, however uncertain the origin of the word *murrain*, its meaning is still more obscure, as it has been employed to signify epidemic disease among cattle of every possible character, from the dreadful carbuncular typhus—of which, and of its spread by contagion to animals of every class and also to man, Virgil has given such a striking description at the close of his third Georgic<sup>4</sup>—down to the simplest and mildest epidemic catarrh. From its fortunate insular position, Britain long remained comparatively exempt from any of these cattle plagues, and when, about twenty years ago, an outbreak of epizootic aphtha occurred, this was generally dignified by the name of *the murrain*; since then, however, the true position of this disease has been recognised, and it is now more qualifiedly and correctly termed the *vesicular murrain*; and it is this disease, the *aphtha epizootica*, *maladie aphthongulaire*, *mund-und-klauenseuche*, which Dr Hislop describes as being conveyed by contagion to man. The symptoms of aphtha epizootica, as observed in cattle, are at first merely those of general febrile disturbance of the system, with frequent rigors, general soreness of the body, and unwillingness to move, and when made to move, the animal is found to be very lame. There is generally a harsh and frequent cough; but this symptom is not invariable; the mucous membrane of the mouth is swollen, and exhibits little reddish elevations; there is considerable flow of saliva from the mouth, and in about twenty-four hours from the first appearance of the disease, a crop of vesicles is found to be thrown out across the upper part of the mouth, along the sides of the tongue, within the lips, on the muzzle, and in the nostrils. Vesicles are also occasionally found around the roots of the horns and on the external parts of generation, while they are more common in the interdigital spaces, and on the udder and teats, and these latter organs are often very much involved in those animals which are far advanced in gestation or in those giving milk. These vesicles are irregular in form, and have neither the central depression nor the distinct inflammatory areola observed in

<sup>1</sup> HENRIC DE KNYGHTON, *de Event Angl. Scr. Hist. Angl.*, p. 2693.

<sup>2</sup> *Recherches de Pathologie Comparé.* Cassel, 1853.

<sup>3</sup> Vide PARKHURST’S *Hebrew Lexicon.* Lond., 1799.

<sup>4</sup> In imitation of Thucydides and Lucretius, say some commentators; more probably derived from personal observation in the terrible year 43 A.C., described in his first Georgic.—Vide HEYNE’S *Notes.*



true cowpox.<sup>1</sup> They are at first about the size of a millet-seed, but gradually increase in size to that of a kidney-bean, or larger. The contents of these vesicles are at first pure serum, but within a few hours this becomes more less opaque from the admixture of shreds of lymph and pyoid corpuscles. Sometimes this fluid is absorbed and the cuticle desquamates, leaving a red raw surface, at other times the vesicles burst and scabs are formed, while in severer cases ulceration occurs, which may take eight or ten days to heal. These symptoms all increase till about the third day, after which they commence to decrease, and in mild cases the animal is well in little more than a week. The treatment consists chiefly in giving nourishing food, the use of mild astringent or disinfectant washes, with tonics subsequently. This disease, though long well-known on the Continent, was yet wholly unknown in Britain till the spring of 1839.<sup>2</sup> It is not known how it first arrived hither, and the mode of its communication has been often disputed. In densely peopled countries, where much intercommunication exists, it is often difficult to trace the spread of diseases by contagion alone. The spread of measles, for instance, gives perhaps one of the most striking examples of this difficulty. With us it is one of the commonest diseases of childhood, which almost every one passes through in their youth once for all, and scarce any one thinks of inquiring whence it comes; yet, in the Færøe Islands, no case of measles had occurred for upwards of sixty years, till it was taken thither by a labourer from Copenhagen in 1846. Its spread could be distinctly traced from man to man, and was only checked by establishing a rigorous "cordon sanitaire" round the affected localities.<sup>3</sup> That it was thus checked is of itself sufficient proof of the purely contagious character of this disease. There is no question but that the vesicular murrain is contagious, because it is well-known to be inoculable, and whole herds have been often artificially inoculated with the view of giving them a milder disease, and getting them more rapidly through it; and, considering that this is truly a panzootic disease affecting animals of every class, cattle, sheep, deer, pigs, dogs, cats, horses, geese, ducks, pigeons, fowls, hares, rats,<sup>4</sup> &c., it is surely more consistent with reason to suppose that the contagion has, even in the most obscure case, been conveyed to the animal by some dog or rat,<sup>5</sup> than to imagine that it forms a mysterious exception to a well-known law. Dr Hislop's two cases corroborate the fact, that man forms no exception, but is equally susceptible to this contagion with other animals. Continental medical men have long been well acquainted with this fact, and numerous instances are found recorded in their journals.<sup>6</sup> The disease had scarcely made its appearance

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<sup>1</sup> Under this head it may be well to mention, that true cowpox is always distinguished by an umbilicated vesicle surrounded by an areola. There are several kinds of spurious cowpox described by veterinary authors, distinguished by the conoid form of the vesicles, the absence of areola more or less complete, and the generally anomalous course of the disease. The worst that can attend the inoculation of man with matter from these spurious vesicles is absence of success; it is otherwise with that from the aphthous vesicles, as we see that disease may be actually produced. M. Prinz, of Saxony, mentions an anomalous variety of vesicular murrain in which the vesicles were placed upon a hard and inflamed base.—CLARUS and RADIUS, *Beiträge*, ii. p. 78. *Vide* also HILDENBRAND, *Institutiones Practico-Medicæ*, Vienne, 1833, vol. ii. p. 310, &c.

<sup>2</sup> *Veterinarian*, vol. xiv. p. 184.

<sup>3</sup> *Vide* a most interesting paper by Dr PANUM of Copenhagen, *Archiv f. Phys. Hielkunde*, t. ii. It is also published in the *Edinburgh Monthly Journal*, June, 1851, p. 589.

<sup>4</sup> KRIEG CASPER'S *Wochenschrift*, 1839, p. 561. SCHNEIDER *Erfahrungen über die Maul-und-Klauenseuche*, Freiburg, 1840, &c., &c.

<sup>5</sup> *Anker Einleitung zur Erkenntniss*, &c., *der Maul-und-Klauenseuche*, Bern, 1839.

<sup>6</sup> So early as 1707 we find it recorded,—Idem malum (vesicular murrain) ex impuritate maligna seri simili affectit modo dispositos, præsertim juniores homines quosdam cum deliriis, quosdam absque deliriis, omnes vero febre catarrhali maligna vires et partes citissime consumente.—*Ephem. Nat. Curios.* Cent I. et II. p. 156. *Vide* also *Andrea über die gutartige Maul-und-Klauenseuche*, Magdeburg, 1839, &c., &c. *Vide* HAESINGER, *op. cit. passim*—where very many cases are related, observed both by medical men and by veterinarians.



in this country when it was found affecting man in the person of a young farmer, who was inoculated by means of a wound on his finger, and who had the characteristic vesicular eruption on his mouth and nose, attended by very severe constitutional disturbance and great prostration of strength.<sup>1</sup> A similar but somewhat milder case was observed about the same time by Mr Duncan of Colinsburgh, in Fife, in the person of a boy employed in attending on diseased cattle.<sup>2</sup> Many other cases have been since recorded,<sup>3</sup> and they are indeed so numerous when ferreted out, that there is scarce a cattle-dealer who has not either had the disease himself, or knows of some who have had it. Fortunately in this form it is chiefly found to affect robust men; and it is probably never fatal, though it is just possible that some cases may be buried under the name of *diphtherite* in the books of the Registrar-General.

But there is another and a much more insidious manner in which the contagion of this disease may be communicated to man, and in which it may prove unquestionably more injurious, first, because it is thereby more especially conveyed to those who are young and weakly, and who are thus less able to stand it; and, secondly, because the symptoms produced are apparently much less distinctly referrible to the actual cause,—I refer to the use of the milk of the diseased animals. Whether the milk of animals thus diseased is injurious or no has been already the source of much controversy both at home and abroad; but in this, as in every other similar question, a few positively affirmative cases outweigh whole bushels of negative ones. “*Tous les veaux nourris par des vaches ayant des aphthes aux mamelons ont peri*,” says M. Binet.<sup>4</sup> Andreæ (op. cit.) relates many instances in which calves, pigs, and dogs, fed with murrain milk, died from diarrhœa, accompanied by convulsions, and several cases of death among calves from the use of the milk of diseased cows are mentioned by R. H. Watson of Kelso, in the *Edinburgh Veterinarg Review* for August 1862, p. 505. All these animals were found on dissection to labour under gastro-enteritis; and this was also found to be the case in many pigs killed at once on being observed to be ill, as mentioned by Mr Thombs.<sup>5</sup> Dr Hislop mentions that the children of the farmhouse he refers to suffered from sore throat. Mr Watson (loc. cit.) mentions that several of the farm-servants’ children suffered from sickness, pain in the bowels, and considerable diarrhœa, which was cured by a dose of castor-oil, and stopping the diseased milk, the use of which, if persevered in, might have carried them off as well as the calves. Kolb<sup>6</sup> says, “*Lac potum in infantibus pluribus vomitum acidum et diarrhœam ciebat*.” Krügelstein<sup>7</sup> mentions that children who drank murrain milk were seized with violent fever, swelling of the face, and vesicular eruption in their mouths. Mr Gamgee<sup>8</sup> mentions the death of eight out of nine calves from inflammation of the throat and alimentary canal. Erdt<sup>9</sup> also mentions many instances of disease arising in men, and particularly in infants, from the use of murrain milk. And innumerable other instances might be given<sup>10</sup> in which disease, chiefly in the form of gastro-enteritis, was produced in men, but particularly in children, by the use of butter, curds, or milk, from diseased animals, many of which might have proved fatal but for the timely cessation of the

<sup>1</sup> *Veterinarian*, vol. xiv. p. 152.

<sup>2</sup> *Quarterly Journal of Veterinary Science*, August 1862, p. 506. The case as related to me in a letter from Mr Duncan, was a peculiarly well-marked one. Mr Duncan also mentions having observed a horse affected by the same disease; and the like has been often observed as the result of direct contagion, though probably not more often than in man.

<sup>3</sup> *Veterinarian*, 1846, pp. 112, 117, and 148.

<sup>4</sup> *Annales de la Soc. des Vet. du Depart. du Finisterre*, iv. p. 12.

<sup>5</sup> *Veterinarian*, xiv. p. 127.

<sup>6</sup> *Aphtharum Pecorinarum Historia Succincta*, etc. Tubing. 1828, p. 8.

<sup>7</sup> HENKE'S *Zeitschrift f. d. Staatsarzneik*, xxxvii. p. 239.

<sup>8</sup> *Highland Society's Transactions*, 1859, p. 87.

<sup>9</sup> *Magazin f. Thierh.*, x. p. 34.

<sup>10</sup> GURLT u. Hertwig's *Magazin f. d. g. Thierh.*, vi. (1840), p. 175; vide also *Die Milch in Medicinisch-Polizeilicher Beziehung*. B. Nauheimer. Giessen, 1860, etc.



use of the milk. And yet it is indubitable that murrain milk must have been often used in various forms without anything more than at the most temporary inconvenience, and this is very easily explained; for when the disease is at its height, the milk is apt to be rendered useless by the admixture of blood, or to be so much altered in appearance, or lessened in quantity, as to be rendered unusable, or at least to require large dilution before being sold, and dilution, of course, lessens very much the virulence of the poison. That the milk is really injurious is proved not only by the cessation of the symptoms on its use being discontinued, but also by their immediate production by the experimental drinking of the milk, as has been proved by Jacob<sup>1</sup> and Hertwig.<sup>2</sup> At the height of the disease the milk is very often sour.<sup>3</sup> Microscopically examined, it presents granular bodies and agglomerations of globules,<sup>4</sup> precisely resembling the milk of newly calved cows; but there is one point in which, so far as I know, it differs from all other milk, and that is in its coagulation on being boiled, or having its temperature only very slightly raised by being mixed with hot gruel, etc.; and the coagulation is something quite peculiar, and not to be forgotten when once seen, as it runs into innumerable little fibrous or flocculent masses,<sup>5</sup> leaving the fluid part like a milky whey. It is a very general opinion among continental veterinarians, that when the milk can be boiled without coagulating, it is no longer dangerous to use; and Hildebrant, in Magdeburg, expressly states that he had never observed a single case of injury to health from the use of milk which had been boiled without coagulating.<sup>6</sup> This, therefore, is an important point to remember, and it quite agrees with my own experience. Last winter, the milk supplied to my family disagreed with the children, and particularly with an infant being brought up on bottle. On examination, I found that it presented the microscopic and chemical peculiarities described above, and I at once taxed the dairy people with having murrained cows. The reply was, that there were no murrained cows in the dairy, but a number of new-calved ones. This statement quite agreed with the *microscopic* character of the milk, although, so far even as I then knew, it did not explain its *chemical* peculiarity of easy coagulability. Still, as at that time I was unable to investigate the matter more accurately, I contented myself with only making use of the cream, and that very sparingly, and combined with a certain amount of lime-water, till this symptom of easy coagulability had passed off. I may add, that at that time I was not aware that this easy coagulability of the milk had been so much insisted on by continental authors as the result of murrain, and as a proof of its possessing injurious qualities.

I have no remarks to make as to the use of the flesh of murrained animals as food. The vesicular murrain is productive of so small a mortality, that it is comparatively little dreaded, and probably but few cattle are slaughtered because of being seized with it; and, besides, the whole question of the use of diseased meat for food is one of too great importance and of too vast proportions to be entered on now.

I have only two remarks to make in conclusion: The first is, that it is wrong to suppose that a thorough investigation of all these matters, and particularly of the relations and injurious influences exerted by epidemic disease among cattle upon man, can possibly be injurious to any class of individuals. All farmers, cattle-dealers, and dairymen would gain far more in the end by the prevention of epidemic disease, which such an inquiry, properly carried out, would be sure to lead to, than their primary loss would amount to, even supposing mankind were to refuse to testify their sympathy for them by eating diseased meat and drinking

<sup>1</sup> *Journal de Médecine Vétérinaire*, pub. à l'Ecole de Lyon, t. ii., 1846.

<sup>2</sup> *Medicinische Vereinszeitung*, 1834. No. 48, p. 226.

<sup>3</sup> *Die Milch*, etc., p. 34.

<sup>4</sup> RAYER, *Archives de Med. Comparée*, No. 3. M. DONNÉ, etc., *Memoires de l'Académie des Sciences*, tom xvii.

<sup>5</sup> "Faserigen clumpen." ANDRÆ. *op. cit.*

<sup>6</sup> GURLT u. Hertwig's *Magazin*, vi. p. 179.



diseased milk,—a state of matters showing a phase of mind closely allied to that of the South Sea islander, who, standing by the deathbed of his chief, proposed, through his tears, to evince his sense of the greatness of his loss by eating the body without salt! Besides, the pecuniary loss could be made up in various ways, particularly, as is the case in Holland, where cattle is the chief dependence of the people, by a system of mutual assurance. The other remark I have to make is, that the day has gone past for an isolated individual or craft to avert pestilence, as Empedocles did when he shut out the sirocco by stopping a mountain-gap, and removed intermittent fevers by changing the course of the river Hypsa. These large and beneficent operations are in our day reserved for GOVERNMENTS; and our duty as a profession is to urge upon Government, by means of our own governing bodies (who exist for that very purpose), the necessity of undertaking *the prevention* of epidemic disease among both men and animals, to point out the best modes of securing this prevention, and to see that these measures, when become law, are properly carried out. In a word, it is our duty not to appropriate to ourselves, as is too often erroneously done, but to endeavour to impress upon our rulers the sentiment so nobly urged upon Cæsar by Tully, “Homines enim ad Deos nulla re propius accedunt quam salutem hominibus dando.”<sup>1</sup>

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## OBITUARY.

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### THE LATE JOHN MILES HALES, Esq., OF OSWESTRY.

WE have received from Mr Cartwright, of Whitchurch, notice of the death of John Miles Hales, Esq., of Oswestry, in the county of Salop, veterinary surgeon (whose first apprentice he was), which took place on the 4th December last, aged sixty-four.

Mr Hales was originally brought up to the medical profession, but having a desire for the veterinary art, and thinking there were quite as good openings to gain a livelihood in that profession as in the other, he entered the Veterinary College, London, and obtained his diploma on the 16th July, 1818. He then commenced practice in Oswestry, and continued there up to the period of his death, during which time he carried on a pretty extensive practice, but chiefly confined to the horse. His general demeanour was that of a gentleman, strictly honourable in all his dealings, and a lover of his profession; and never swerved, under any circumstances, from the path of rectitude in his professional career, and respected by a large circle of friends.

About the year 1839, he was appointed Veterinary Surgeon to the North Salopian Yeomanry Cavalry.

In 1845 he was elected coroner for the Oswestry and Pirnhill districts. The Hon. Thomas Kenyon, in proposing him, said, “that he had known Mr Hales for some years, and had no doubt of his capabilities for the office; that he was a man of sound sense and an honest heart, and felt confident that he would use every exertion to make himself conversant with every part of the duties which his office required.” And H. P. Aubrey, Esq., in seconding the proposition, said, “he had known Mr Hales for twenty-seven years, and he was sure Mr Hales, from his medical knowledge and general intelligence, was as fully qualified to fill the office as any one they could select.”

Some years before this he was also appointed Secretary and Dispenser to the Oswestry Dispensary, Secretary to the Oswestry Society for the Prevention of Crime, and Clerk to the Street Commissioners up to the time of the surrender of their powers to the Oswestry Town Council.

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<sup>1</sup> *Pro Ligario*, cap. xii.



In the year 1829, he sent his first communication to the *Veterinarian*, and at intervals sent many more invaluable ones to the same periodical, all of which showed that he was deeply versed in veterinary lore, and was well grounded in his profession, and a thorough investigator of the subject he wrote upon. If it will not be occupying too much of your space, I should like to put on record the different papers he has written, viz.—

In 1829, Case of Rupture of the Diaphragm, and Observations on some previous published ones.

1830, A Successful Case of Bronchotomy.

1831, Treatment of some of the Diseases of Cattle.

1832, Case of Inflammation and Disorganization of the Liver in a Horse.

„ Case of Rupture of the Peritoneal Coat of the Liver in a Horse.

„ Curious Case of Abscess in the Lungs in a Cart Mare, and sudden death.

1833, On Wounds in the Thorax.

„ On Strangles, and its occasional anomalous appearances and consequences.

1834, On Glanders.

„ Two Letters on the Absorption of Cataracts.

„ On Hernia, as to Soundness.

1835, A valuable paper on Inflammation of the Jugular Vein, and its Secondary Effects.

1836, On the Use of Cantharides in Anasarca and General Debility.

1839, On Stringhalt.

1842, On Pleuro-Pneumonia in Cattle.

1843, On Cortion in a Mare after Impregnation.

1844, On Horse and Cattle Insurance Companies.

1858, Comments on the Horse Cause, *Barrett v. Preece*.

I may finally observe, that he has brought up respectably the large family of twelve children, and has left a widow to deplore his loss.



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### ORIGINAL COMMUNICATIONS AND CASES.

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*Exposition of Original Views on some of the Component Structures of the Horse's Foot, with the object of explaining its Functions.*

By Professor GAMGEE, Sen., New Veterinary College, Edinburgh.

THE subject which I am about to treat belongs to a series, on some of which I have already expressed myself in communications published in this *Review*; those to be found at pages 505 and 633, vol. iii., and at 438, vol. iv., may be referred to.

Aware that some readers may exclaim, "What have these questions to do with the work of shoeing horses, or of prevention and cure of lameness?" I answer, Everything.

Having stated, when describing the hoof, amongst other things, that its sole formed a more important part of the whole than has been taught and understood, and having used all my energy to discourage the cruel custom of paring away and also of softening that structure, I purpose affording more ample reasons now, as it is on these that my practice and teaching are founded.

The sole of the horse's foot is described as being concave on the lower or ground surface, and convex on its inner or upper surface, and it is added that the sole so formed possesses the properties of an arch.

All the above, as facts, I agree in adopting, and more in the same direction, viz., looking at that arch, I observe its relative connection with the wall of the hoof, hence some deductions from the characteristic structure of the sole, it being composed of superimposed plates of horn as it is, which, in the aggregate, taking the whole formation, make up an arch such as man's hand never formed.

Finding myself in accord with all the teaching relative to what have been for some time past popularised notions on the physical form and character of the sole of the horse's foot, we (I mean, my brethren of the profession) shall certainly come to agreement on the most important of all—its functions.

I do not consider the mere seeing structures to have any necessary connection with the science of anatomy. If seeing were the re-



quisite, then butchers and knackers would be experts. The structures of which I am treating are all as visible as the sun in the horizon. It is not only by calling attention to physical aspects, but mainly on non-correctly observed functions, that I take my stand.

The sole of the foot, as is said, is an arch; yes, and all deviations which misapplied art inflicts tend to render a horse a cripple and worthless.

I now beg to ask the parers away of the sole, and those who have inadvertently adopted the softening, soddening habit,—Who ever knew even a human constructor to build an arch and then weaken it until it yielded beneath its weight? Yet such have 70 years' false teaching made common practice, not only in shoeing, but in the whole management of the feet of horses in this kingdom.

An engineer builds an arch and lays a bridge across it, or he continues his arch, covers it in, and makes it to support the pressure of a mountain: and an architect sees a weak wall, and he strengthens it by cutting a hole, and making an arch, by which the edifice above is supported.

But I am prepared to hear in reply, that the functions of horses' feet are not to be judged by such standards as I have adduced; therefore, adhering to the proposition, that the sole is an arch, I am farther going to prove that it is destined to sustain, and does sustain, more weight than any arch of similar bulk that ever was or can be made by man.

We will now see what is superimposed on this arched structure, the sole; why, the inverted arch of the *os pedis*, which bone is a mass of strength, its exterior is all formed for bearing and attaching surfaces, the phalanx being made up of exquisitely distributed plates of bone to be spread over the arch of horn beneath.

The mind may obtain a first notion of the connection and action that exists between the pedal bone and the sole of the foot, if I adduce, as a rough example, the common saddle, in which the mechanic has made iron arches, one before and the other behind, between which he carries iron plates, and these are regulated on a wooden framework. Again unyielding webbing is drawn across in such a way as experience has taught to be suited; and beneath this framework of iron, wood, and linen web is placed a pannel, and above these a dried skin. Then all the apparatus depends on the iron arches for good effect. This arched contrivance is then laid on the arched or barrel-formed back of the horse, and above it the rider seats himself. This is a rough but not inapt sketch of the rare and exquisite work under consideration.

Every anatomist who has examined the coffin-bone of a horse is struck with its non-resemblance to other bones. Its bottom surface is smooth and compact, unlike articulating surfaces, and equally unlike the surface of the other bones of the limbs. In fact, this arch is made up of bone of exquisite compactness for strength. The centre of the bony arch is placed under the axis, through which the bearing from



the coronary bone is transmitted, and the arch spreads its radiating plates laterally and forwards, whilst backwards it has columns and buttresses of strength, represented exteriorly by the semilunar crest.

The interposing medium between this inverted *arch* of sole and pedal bone is the strong fibrous structure, the sensitive sole, exquisite for connection, adaptation, and as a medium for circulation and secretion.

I must now hasten, in necessarily brief outline, to other views of this great subject.

Though I am more intent on investigating things than names, yet one cannot feel indifferent to the requirement of some proper definition of parts; but since we lack that, I shall, as well as I can, make myself understood; and by the same rule as a poor man blessed with many children finds friends to suggest names for them, so it may happen after a while with the different parts of the horse's foot.

The foot of the horse, physiologically considered, begins where the radius terminates in the fore and the tibia in the hind limbs, that is, the knee and hock and all below enter into the pedal function. This definition is given in the work on Anatomy by John Gamgee, Principal of, and James Law, Professor at, the New Veterinary College.<sup>1</sup>

Of necessity I must describe the functions of the foot as far as this communication extends, according to the above definition; there is no other right way. A few explanatory remarks for my taking this license in treating on the foot may be called for, though reasons will appear as we proceed. Firstly, there has been no agreement on names for several parts. Some half-dozen different localities are called the heels; then, as regards the bones, Bracy Clark makes three to constitute the number entering into the construction of the foot, and with that view he consistently begins by describing the *os pedis*.

Mr Coleman, on the other hand, makes out six bones as belonging to the foot, and he begins, very oddly, by describing first the long pastern, then the two sesamoids, and finally, the three last bones of the foot.

Professor M. H. Bouley, of Alfort, who has published most recently on the Anatomy of the Foot, says, "The region of the limbs of the horse to which the term foot, in ordinary language, is given, is, strictly speaking, only the extremity of the digit, whilst the foot, considered under a zoological aspect, extends from the knee and hock to the last phalanx."

The above author then goes on and describes the bones of the foot, like Mr Clark, as consisting of three, according to accepted notions. Of the anatomical part of M. Bouley's work, one must allow high praise, whether speaking of his descriptions or the admirably executed atlas of illustrations; but, unfortunately, after giving 150 pages on the descriptive anatomy, the author goes on and publishes

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<sup>1</sup> Edinburgh: Maclachlan & Stewart. London: Simpkin, Marshall, & Co.



170 on physiology, mostly confined to details on the functions of locomotion.

At page 177, M. Bouley, making fresh reference to the structures, says, "The bearing power of the foot is formed by the concurrence of four principal bones, viz., the cannon, the pastern, coronary, and the os pedis; and five complementary bones, viz., the two pyramidal or splint bones, the two sesamoids, and the small sesamoid or navicular." Thus, anatomically, three bones only are described, whilst, functionally, M. Bouley tells us there are nine which go to form the horse's foot.

It is quite clear here that M. Bouley, like the late Professor Coleman, has put more hobbies to his carriage than he can drive. If these physiologists had followed the old track, and had described three bones, viz., those contained within the hoof, there would not have been much to say. It was easier to sustain an argument about the form and movements of the thumb and great toe, than it is to understand the more complex and grand whole—the human hand and foot. So it is with the horse's foot. Once other than the three lower bones were taken into account, a reason should be implied. Coleman had one, he never lacked a plausible hypothesis; his notions were peculiar about the office of the sesamoid bones. What M. Bouley is thinking about when he takes in other three bones, which altogether are incapable of making any movement complete, I leave him to answer. If he had kept to the three lower bones, like Clark, there would have been consistency, in so far as no new complication of errors would have been likely to result. Such bounding from one error to another has been perpetually going on in these matters during the whole of the present century.

I would gladly have renounced the task of noticing M. Bouley's work on the "Physiology of Locomotion," but its seeming completeness, its recent date, the position of the author, and his really good part on the descriptive anatomy, make the labour of writing on the same subject of little avail, unless views so opposite as are the author's and my own can be set clear.

When I see M. Bouley pitting the opinion of La Fosse the elder against that of the great Bourgelat, I get an insight into the why and because of his bewilderment. And when I see the list of names whose works he quotes, and gives their separate opinions, without furnishing us with any clue to his own, I look on the case like that of a man dismissing his old classic authors and going to the book-stall for lighter stuff, and using such material as reliable.

There are not three, nor yet two ways, of describing the foot of the horse, so that it can be understood functionally.

Comparative anatomy may not only be brought to our aid in this place, but is necessary. Moreover, no writer on the physiology of man ever omits to compare with the lower animals, and with the horse especially.

I shall endeavour now to impart my views on the functions of



horses' feet, extending them to the physiology of progression, and begin by taking account of the main structures where the great shafts complete their action, and where those reacting from the ground, meet. We shall, in this view, find sixteen bones in the anterior pedal extremity, and fifteen in the hind. The anatomist will not require here detailed descriptions of those beautifully constructed joints, the knee and the hock of the horse, and only anatomists can understand much of what must of necessity be treated briefly here.

The two joints are built up, the knee of seven, and the hock of six separate bones, which give such adaptation of form, such strength, and just so much movement between each as the necessarily very limited motion requires for exactness, whilst they are bound together by ligaments as strong and as unsusceptible of stretching as the bones themselves; thus ends are obtained, which, by the simple connection of two long bones, were impossible. One of the most important characteristics of joints is, that they form levers, and this is marvelously the case in the knee and hock joints of the horse.

Having described, in former papers, the ligaments, from the foot to the knee and hock, which effect locomotion, I will pass on to notice the movements of these bones, to which other structures are subservient to the great object—action.

The motion endowed by the knee-joint is chiefly limited to flexion; in the horse it has no rotatory action. Movement is conferred in the greatest degree attained, through the articulation of the three upper carpal bones with the great shaft, the radius. Motion, also considerable, is afforded between the two rows of adapting bones in this joint, in combination with their wonderful provision for strength. The lower three are placed on the cannon bone chiefly, having smaller articulations with the splint bones. There is no motion beyond that destined to avoid jar in the articulation of the carpal and tarsal with the shank bones; in these joints we have the moveable connection between the great shaft-bones above, and the reacting levers below. The six carpal bones noticed continue the axis through which force and weight are exerted; the seventh bone of the knee, the pisiform, not being one for sustaining bearing, but a lever with upward action, I shall defer its description for a future paragraph.

A few observations on the hock joint. The motion between the upper shaft, the tibia, and the chief bone of this joint, the astragalus, is formed in the character of a screw, and is considerable; that action is effected with wonderful economy of muscular energy, through the distribution of the bones relatively. The astragalus conveys the whole weight on to two rows of bones, laid one upon another, which again, as in the fore-limb, form the medium for transmitting the exerted power to the sustaining bones. There is no appreciable extent of motion between the two rows of bones composing the hock, such as there is between the upper and lower bones of the knee. In the hock joint, almost the whole range of action is pro-



vided between the tibia above and the astragalus below, which move with such wonderful effect in accelerating progression. In the hock, as in the knee, we find one bone whose action is purely that of a lever for upward action, viz., the os calcis. I therefore, for the moment, defer its description also until I treat on action.

My object in this paper is to indicate how all anatomists may observe the horse's movements for themselves, and I hope to help those gentlemen who know little of the structures, to become judges of action, by careful observation from external appearances.

The fore-foot, from the knee, is flexed backwards, and its motion forwards is limited to its being carried to a line with the arm extended; whilst the hind-foot, *i. e.*, from the hock, is carried forwards; and this extremity is limited in its extent of action backwards, so that the movement in the hind limbs in the act of kicking is due to the angular structures above; like the boxer, or the boy who plays at football, the hand and foot are exerted by the upper or lower limbs, with concurrent action of chest or loins; so, when a horse rears on his hind feet, and strikes with his fore, he uses his shoulders as well as his feet. Kicking and striking therefore are not progressive movements in the horse; his great weighty muscles and hoofs are put into use in these, and the foot is made an instrument of defence or offence.

Whenever we see horses represented whilst in fast action, such as in the pictures of the Derby, where several horses are shown as finishing the race, the hind legs are always made to appear extended backwards in a way quite impossible. Neither by art nor accident can horses stretch out their limbs as the pictures represent them in such groups; no two feet in the same figure being placed right; and yet art, like literature, must be taken as the exponent of prevailing knowledge on a given subject.

I now purpose turning from the dissecting room and anatomical theatre to the open air, for the purpose of studying the living horse—first, as he stands, and then in action; and like artists, shall select the most perfectly formed animal for my model.

In defining what may be considered good form, I prefer to let Xenophon's eloquent description stand unaltered, and therefore adopt it, and look for "A horse that is well-footed, well-bodied, handsome, and large."

When a horse of good breed, agreeing with the above description, physically, and studied so that we can take a side view of him, we observe the four limbs placed so that the superincumbent weight of the body is equally distributed. We see projections, angles, and obliquities between the foot and the uppermost part of the fore and hind limbs; and it is easy to discover that the axis of bearing is through the long-bones, with which in the limbs are comprised those intervening, which constitute the knee and hock, not including the posterior projecting bone in each. We will now observe the other system of bones. Six of these in each limb constitute this order, and these are all of them powerful levers; they are the means which give the great



results—power, and rapid action—all accomplished with wonderful economy of force.

The long and broad elbow bone in the fore-limb, and the patella, or knee-cap in the hind, are these levers which, in parallel positions, exert immense force with the great shafts between which they are placed. Descending to the knee and hock, we have new levers, multiplied in number, and their order of function is modified. The pisiform bone in the fore, and the os calcis in the hind, form the two parallel levers, the one projecting behind the knee, and the other constitutes the point of the hock in some quadrupeds, or the heel in man, and also of some of the lower animals.

The number of animals which repose on the os calcis, and whose feet act on the ground from the point of that bone to the distal extremity of the digits, is greater than seems to have been generally noticed. Amongst these we have the hare, fox, bear, kangaroo, moss-deer, lynx, and many others; and amongst these are comprised the speediest and most agile quadrupeds known. Thus we see that where the foot is placed in an angle with the tibia, nearly approaching that of the human foot, the greater extent of movement results from the least exertion. Then turning to the horse and the animals of weight and strength, we find the structures made to support the burden; and while the elevated position of the bones is less favourable for leverage, compensative means are at once apparent, the most perfect for the combined purpose. Thus the horse has great leverage conferred by means of his long shank bones, whilst the more stress is placed on the last phalanx; hence the necessity of a tough hoof, which acts in the economy of the horse's foot, as in all animals endowed with hoofs, like an external skeleton.

The carpal and tarsal bones, I regard as the most effective levers in progression in all animals, and are a fair criterion of the speed or power of limb of any animal. Hence the error of supposing that horses should be short between knee and hock and pastern joints, on the supposition that speed and power results from the short bone. As I showed in a former paper, the reverse is always found to be the case; this prevailing wrong notion is due to these bones having been regarded as pillows and not as levers.

The two bones in the limbs which afford the greatest direct leverage power on the feet are perhaps those projecting backwards in the knee and hock joints, the pisiform and os calcis. Each of these favourably constructed bones gives insertion to the tendons of powerful muscles; each afford large surfaces, furnished with projecting and roughened points, for the attachment of ligamentous bands, which are mainly connected with the splint bones in pairs in each leg. The splint bones are in the form of two inverted pyramids, their function being clearly that of buttresses, on to which these powerful levers, lashed down by their ligaments, act. Though it has only been commonly shown that the outer of these pyramidal bones affords attachment for ligament, as noticed, and that chiefly of the hind



leg, I must state that, additionally, the os calcis is strapped down to both of the splint bones; and that in both hind and fore limb fibrous structures are connected and continued downwards until they are little distinguishable, being blended with other expansions of the same character below. These three bones, behind the knee and hock, all have articulations with the bones composing these joints, but clearly the connection and functions are those for leverage, and not that of bearers of pressure from above; whilst one action is that of sustaining and pressing downwards, the other is a leverage lifting upwards—like two buckets in a well, the one going down and the other rising, only that in the animal the chief exertion of force takes place whilst the foot is on the ground.

The other three bones of this order are the two sesamoids and navicular, or, as the French call them, the pair of large and the small sesamoids; and, in fact, these bones, the pair and the single one, are of precisely the same character, and fill the same office. Both articulate with the bones in the axis of bearing, both give attachment to ligaments for uplifting, and both afford projecting pulleys, over which the great flexing apparatus of the foot slides.

Having already described the parts below the knee and hock in some papers published in this *Review*, already referred to, I shall not dwell longer on them now.

It is not within my limited means here to refer to more than a few of the writers who have treated on the horse's foot, or to each particular incidental part on which I differ from some of them. If, however, I inadvertently fail to do justice to the past labours of any, I shall be glad to be made acquainted, so that I may cheerfully hail a fellow-worker in this important branch of science.

Comparative physiologists have from remote ages taken the horse as the type for exquisite action. Borelli did so in the seventeenth century; and Sir Charles Bell, only a few years since, in his work on the Hand, especially adduced the foot of the horse to illustrate some general laws.

At page 100, Sir Charles says, "Nothing is better suited to illustrate our subject than the horse's foot; and I have it from the excellent professor of veterinary surgery to say, that he has never demonstrated the anatomy of the horse's foot without finding something new to admire."

In a paragraph preceding the one just noticed, Sir Charles Bell says, at page 96, comparing with the human hand, "When we look in front, instead of four metacarpal bones, we see one strong bone, the cannon bone; and posterior to this, we find two lesser bones, called splint bones. The heads of these lesser bones enter into the knee-joint (or properly, the wrist-joint); but at their lower ends they diminish gradually, and they are held by an elastic ligamentous attachment to the sides of the cannon bone."

Sir Charles then goes on to express doubts about the correctness of the opinions entertained, thus:—"I have some hesitation in admitting



the correctness of the opinions of veterinary surgeons on this curious piece of mechanism. They imagine that these moveable splint bones, by playing up and down as the foot is alternately raised and pressed to the ground, bestow elasticity and prevent concussion. I suspect, rather, that in the perfect state of the joint, these lesser metacarpal bones act as a spring to throw out the foot when it is raised, and the knee-joint is bent." Here Sir Charles Bell gives an illustration, showing the bones of the foot, with the knee bent on the radius, and he continues:—"Suppose that the head of the lesser metacarpal bone enters into the composition of the joint, it does not appear that, by its yielding when the foot is upon the ground, the bones of the carpus can descend as long as they are sustained by the great metacarpal or cannon bone. I do not conceive, therefore, that this bone can add to the elasticity of the foot. But when we perceive that the head of the splint bone is behind the centre of motion in the joint, it is obvious that it must be pressed upon in the bent condition of the joint, when the foot is elevated; and that then the bone must descend if the splint bone be depressed when the limb is raised and bent, and have a power of recoiling (which it certainly has), it must aid in throwing out the leg into the straight position, and assist the extensor muscles of the knee."

In quoting at such length an author whose name is so highly esteemed amongst philosophers, I have no other reason than the desire to strengthen the cause of truth.

We here see one of the greatest masters, as an interpreter of the senses, giving up much of his own usually correct judgment, in deference to the teaching of his friend.

How feelingly Sir Charles declines to accept the prevailing doctrine on the function of the splint bones, and says, that he disagrees with the views of veterinary surgeons. Mr Coleman's name is not coupled with this passage, though he was the only veterinary surgeon who was privileged to teach, and that did teach; and that Sir Charles Bell knew, but he expressed his disagreement without exposing his friend. But it is more astonishing still to see, that when Sir Charles did give his own view, that he should have been so prepossessed by the Coleman hypothesis as to let it thoroughly warp his judgment. The supposed elasticity of the attaching structure between the bones set the great man on a wrong course. Had he known, instead, that it was endowed with no stretching or yielding property, and had a right knowledge of the functions of the foot prevailed, such far-fetched ideas as Sir Charles substituted for those of Coleman would have been out of the question.

The important lesson which this incident teaches is, not anything that alters the high estimation in which the name of the really great physiologist stands, but as giving some notion of the influence of such a power as the late Professor Coleman possessed for turning the minds of the many, when he alone was privileged to teach. The last



man who I should have believed could so have given up to the dogmas of another, was Sir Charles Bell. How then could a class of students, renewed from year to year, stand the test, when every mind became biassed and bound to false imaginations.

Having made our observations accurately on the moveable bony structures of the limb and foot, I will submit my own views on these, as seen with the horse standing, and in this aspect include the distal extremities of the foot.

The hoof and the organized structures it covers are perfectly adapted to each other, and are no more to be looked on as separable parts than is the skin of the human hand or foot from the subjacent structures. None of these structures can be otherwise regarded than as constituents of the organ of which it is a part. But the hoof of the horse is looked on as a dead substance, whose only use is to afford a covering to parts which are alone essential. I invite readers to take a different view of the whole foot. The hoof performs real functions of its own as much as do the bones or other structures. It forms altogether an outer casement, not essentially for protection, but for sustaining also, and for co-operation, corresponding to the necessary degree, with the bones internally. A large share of the functions of the foot is due to the hoof; its texture and structures are of a yielding and rebounding character, viz., at the posterior region, like pliable tissues composing the inner structure. Anteriorly the hoof's construction is such that it does nothing less than sustain the whole weight and force which the limb exerts on it.

I must now in some degree modify my views from those I formerly entertained on the exertion which is carried on by the anterior region of the foot; having said that in action, by the foot revolving from heel to point, the weight was thereby conveyed through a given axis, and was so distributed that no one point or region of it at any time received the whole burden.

I was led from observations made at the time to believe, that in the revolving of the foot, the weight or pressure would be so distributed that no part of it sustained the whole; but further observation has convinced me that, whilst by alighting on the posterior region of the hoof, all shock is avoided, yet this is only a preparation, as turning or lifting the exerted structures on to the anterior region of the foot, the whole weight and force together are expended on the anterior part.

Now for a few remarks on the attaching medium between the wall of the hoof, and the pedal bone and cartilages. Here, again, I have to combat the opinions of men of eminence, regarding the character and function of the interconnecting plates, the laminae. The question of elasticity or stretching comes again uppermost; and curiously, while everything has been talked about as possessing elastic and stretching properties, the poor dumb horse has been shaken and tortured as if placed on a harrow.

I have in former parts said that it would be incompatible with



Nature's exact assigned movements, that parts should so stretch, dilate, and open, as the horse's foot has been described as doing.

That which has been regarded as a spring due to individual structures yielding, is entirely the result of perfectly unyielding structures moving on one another. It is to the rotative action and apposition of one bone with another, and the marvellously constructed joints, that the perfect absence of concussion is due.

The most exquisitely rebounding structures in the horse are, beyond question, where we should expect to find them—in the foot. And that rebounding or elastic property is all due to structures moving in their assigned spheres when preserved in a normal state of compactness and texture. I allude here to that part, so little organized or endowed with life as to be in a great degree amenable to external influences—the hoof. The influences hitherto supposed to be injurious were those of dryness such as the atmosphere confers; that state which should be dreaded however, considering the value of the horse, the love for the animal, and humanity towards him, should be wet to the hoofs, and not the normal dryness, implying also cleanliness.

Nature has endowed a regulative function to provide against undue dryness; like the scarf-skin, the outer drier and harder layers protect the progressively formed moist and yielding layers of cells beneath them. But there is no provision for evading the evils of moisture whilst it continues to be applied; and in that unnatural state the bony arch of the coffin-bone loses its support below, and becomes, as Xenophon described the foot of a horse, which, like that of a bandy-legged man, he said, “bears equally on the soft and on the harder parts.”

As has been said, the arched form of the sole, with all its substance and firmness of texture, is necessary to its requirement; it is then equally positive to my mind, that it is essential for the wall which supports that arched floor to be kept in a given position, of a determinate geometrical figure, and that there should be no bulging such as a weakened state of any part of the hoof would admit of. Provision is made in the foot, as Nature adapts it, for all required ends.

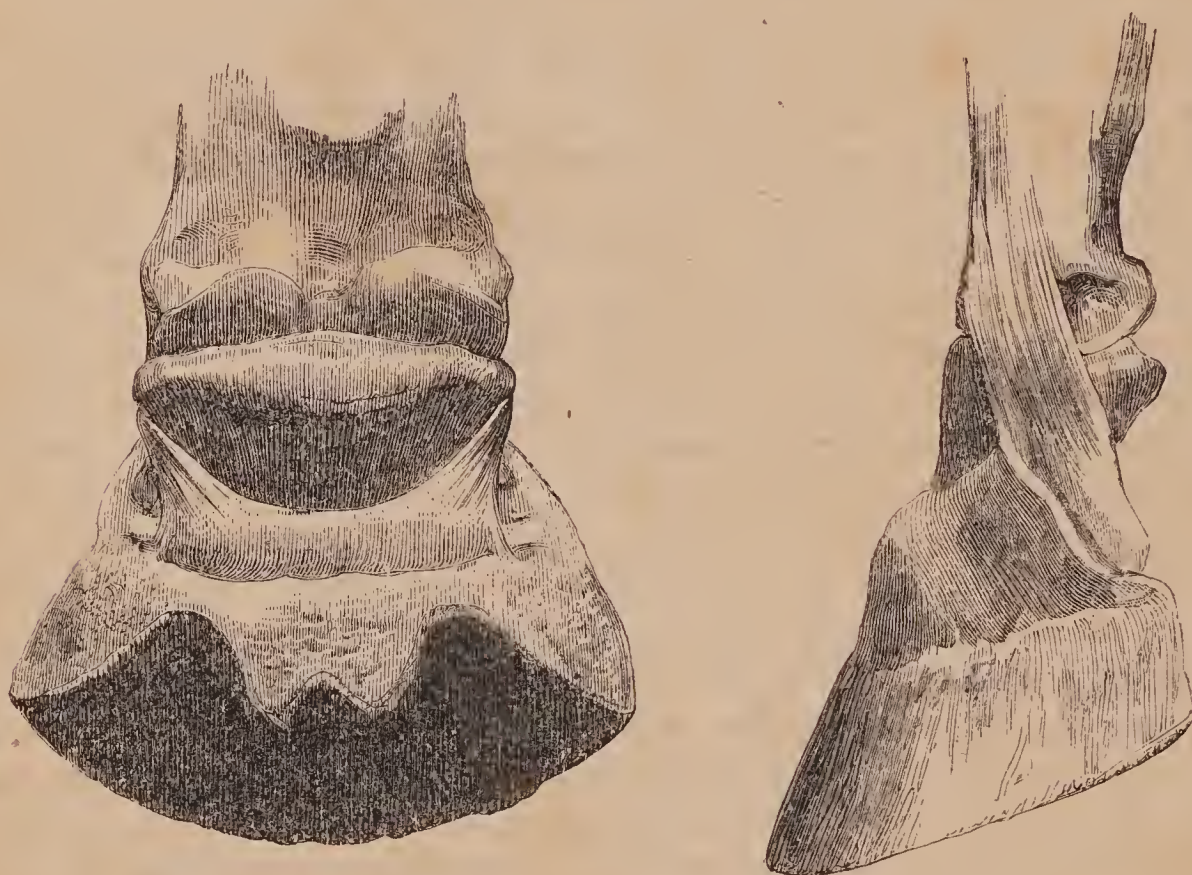
On a former occasion (vol. iii. p. 512) I exhibited an illustration showing ligamentous bands which are attached to the upper margin of the lateral cartilages, and to their inner surfaces, which converge inwards and forwards, so that the cartilages on either side are connected to central structures, viz., the plantar fascia and the fibrous frog, bands from the latter being inserted into the central posterior part of the os pedis. By this provision, since all these strong fibrous structures are inelastic, though rebounding like a bow, and moving with the hoof and cartilages, no dilatation, but a rebounding, results.

Having seen these provisions in structures in close connection with the hoof, and that the plantar surface of the latter is prevented from constringing, whilst the whole hoof is in its integrity, I began to search for the means provided to prevent dilatation of the hoof, which, if allowable, would be incompatible with all the other functions above



described; and I find that it is its laminated attachment that constringes the wall internally.

It is whilst the greatest degree of pressure is being exerted on to the last bone, and whilst the extremity of the lever is being elevated posteriorly by uplifting powers that the arches, both of bone and sole, require all sustaining strength.



At this juncture there is a concentration of energetic force called into action in the pedal extremity, whilst the effect is that the weight is passed over the point of the lever. (See illustrations above, exhibiting the flexor pedal ligaments, on which force is exerted.) In the meantime the limb has been sustained by the upward and forward pressure of the posterior region of the foot. And it is in virtue of the connecting medium which the laminae afford, and the recoiling round the cartilages as the hoof does, that the yielding posterior region compresses and sustains the anterior, and, by binding structures, concentrates strength.

The foot is compressed, instead of, as has been said, widening when pressure is conveyed on to it, and it dilates when lifted. And this applies not only to the foot of the horse, but holds good as a physiological law.

If the horse is put into a walk, movements such as have been described will take place. I cannot in this communication enter into more than a few details on 'Progression,' such as refer to the sequence, in which the limbs are moved in all the paces. My aim is more directed to the consideration of important questions on the general economy of the foot and movements of the limbs which produce progression.



The horse moves in the walk, as has been well described by ancient writers, and in recent years by Percivall and others, by lifting one foot at a time in regular succession. A fore foot is always first relieved and lifted, it may be left or right, according to the standing position at the instant.

It is not, as seems commonly thought, where thought is given to the matter, that in the movements of all four limbs so many different mandates from the will are given. One flash of life's *electricity* puts all in motion.

The lifting of the foot into the air, and even extending it, produces no movement. Thus, when draughtsmen represent a horse standing firmly on three legs, with one fore foot lifted and fully flexed, they represent the prevailing erroneous notions on the way movement takes place. An animal may lift one foot at a time, but will never move until the full action of all the limbs is exerted.

The body of an animal—I use the word generally, because it applies to every animal—always is moved before a foot is lifted. The direction in which action proceeds is from the great bony shafts forming the upper regions in connection with the trunk. Thus performing their steady strokes, these shafts set the knee and hock joints moving, and the levers which have their fixed parts on the ground are all at the same instant set in movement. A fore foot is always the first to be lifted in the walk, and this takes place as the body passes over, when it is then flexed and extended. The opposite fore and its diagonal hind are at the instant the sustaining powers, while the diagonal hind of the fore first lifted is raised posteriorly, and is in the propelling attitude; which act done it passes on, its lateral fore being the third to move, whilst the first fore moved has alighted and its lateral hind has also moved. The action of the horse can be better learned by looking at the limbs in pairs, than by embarrassing the untrained eye and the senses with the task of following the action analytically of all four feet at once. The great powers which result through muscular energy, on angular shafts, which are acted on from above, and have their fulcra on the ground, take place in diagonal lines from each fore to its opposite hind; whilst there is equally a continued sequence of harmonising force going on between each lateral fore foot and its parallel hind. Thus perfect equilibrium of gravity in the body prevails. The way this action is produced, as most of my readers know well, is through the opening of the angles of the wonderfully constructed limbs, which as much surpass all machinery made by human hands as all Infinite works surpass man's conception. The action of the fore limbs always takes precedence of that of the hind. I reserve to myself hereafter to revert to the first move in the gallop, correctly given by Borelli, which does not alter the above proposition.

In my former communication I stated, and also showed by a woodcut which has been reproduced in this, with an additional one, that in the horse is especially exhibited the great feature in animal mechanism—the most perfect leverage power. The great effect of raising the



weight over the fulcrum is brought about by the reacting bones, and the flexor muscles of the foot only take up and continue the movement when the weight has passed over the foot, which, under great speed, are functions so rapidly executed as to evade the powers of the eye to discriminate; whilst the same effect, when observed on a heavy Clydesdale horse drawing a waggon, with two tons' weight, ample opportunity is afforded to see every act, and to see one fore foot suspended and flexed, while the other, with its diagonal hind, is pressing on the ground; and the diagonal hind to the fore lifted, is elevated and constricted in a propelling attitude, and the whole weight is bearing on the plantar arches of the pedal bone and the sole of the sustaining feet. The resistance overcome, the body moves, and then, and not till then, the lifted fore foot is extended, and implanted at a distance represented by the degree of velocity attained in the effort.

I hold it as a law, that the same phenomena observed in the slower paces are in operation in the swiftest; and that the quadruped has never less than two feet on the ground in his fleetest, any more than in his slower paces, and that man, and all bipeds, has always one foot in contact with the ground, in progression.

To all those who assert that in fast trotting and galloping the horse flies or moves by a succession of leaps through the air, without for the instant touching the ground, I unhesitatingly say that the notion is opposed to proof, and is inconsistent with all natural laws, whether relating to gravitation or to physiology. I have maintained, as a well-observed fact, that the horse and other quadrupeds do not move, as is almost, if not universally believed, by bounds through the air.

Leaping is a thoroughly distinct function from ordinary progression. So great is the atmospheric pressure on the animal, or, to use another expression, the attraction to the ground, that it is only at great cost of muscular energy that the horse can, for a special object, bound over heights or over open spaces. There is, moreover, the requirement of great powers being exerted in the act of alighting from leaps, all rendering these efforts expensive to the system, and exhaustive; hence rarely called into action.

Those animals which, for given purposes, Nature has endowed with jumping powers, cannot run; and in these we see provision for easing the body down after it has been committed to the air. Thus the grasshopper spreads his slender wings, and the frog his wide-webbed feet. I have extended my observations enough to prove that the quadrupeds and bipeds which run speedily do not mix leaping or flying in the action; and I hold the remark to apply to birds which run or fly; still these are made distinct and unmistakeable. The ostrich runs, and so does the common turkey, or the partridge, until these latter spring from the ground and take wing.

After referring to writers on the horse, on the subject of progression, and finding myself at variance in opinion with them, I had recourse to the works of human and comparative anatomists, and



selected those of G. M. Humphrey, Esq., M.D., F.R.S., of Cambridge, who, in his work on the human foot and the human hand, published in 1861, says, at page 64, "In running the process is much the same as in walking. The chief difference is that, whereas in walking both feet are never off the ground at the same time, and both are upon the ground at the beginning and end of each step, in running, both feet are never on the ground at the same time, and both are off the ground, and the body is flying unsupported through the air, at the beginning and end of each step."

At page 66, on the action of the horse, the author says, "The distinction between the paces of other animals resembles that between walking and the running of man, and is equally definite. Take, for instance, the walking, trotting, and galloping of the horse. In walking the fore and the hind limbs of the same side are moved together, or nearly together, but they do not leave the ground till the limbs of the opposite side are placed upon it; so that at one period all four limbs are placed upon the ground together.

"In galloping and cantering the horse springs or bounds with all his four limbs at the same time; all the feet are thrown up nearly together; and all reach the ground nearly at the same time ready for another spring.

"I say that the feet are all thrown up *nearly* or *quite* together, because the fore and the hind limbs of one side take precedence a little of the others, or 'lead, as it is called.'"

I shall make no remarks on the above, only to say, that I perceive nothing correctly described, though it is a fair representation of what most works on the subject contain, and of the prevailing notions.

The author says, in his large work on the human skeleton, published in 1858, at page, 588, "If greater rapidity be required, *running* is substituted for walking. The difference is, that the trunk, instead of being quietly delivered over from one leg to the other which is already on the ground to receive it, is thrown forward, with a spring, by the muscles of the leg which is leaving the ground, and remains for a time suspended in the air, or rather flying through the air."

In 1861, whilst on a visit to Birmingham, my mind being engaged in inquiries relative to the progression of the horse and other animals, I went to see some foot-races between "athletes," and shall now extract from my note-book a memorandum which I made at the time:—

" BIRMINGHAM, 26th December, 1861.

"I went to Aston Cross; saw three foot-races. Two of these were run at the distance of 110, and the third at 100 yards. I observed every movement of the runners, and fully assured myself, that at no time during the race were both feet of the men disengaged from the ground."

There is no doubt in my mind that the same law of progression



that I had observed in the horse, dog, and other animals, prevails in man.

At no time in the running, either in starting or in the finishing of the race, was there the slightest deviation or approach to a leap from the ground.

Many false starts, long delays at the post, and attempts to get off, added much to the opportunity for scientific observation.

Much more could be said on many observations made at various times; but I will now adduce one, which I hope may be interesting to others, as the facts revealed were to myself, when I began to observe the same phenomena on animals.

On 16th March, 1863, I went to the Portobello Sands. The tide was high at the time, and I waited until it subsided, when it left a clear beach. Several paces were walked, and a clean imprint of the foot being left on the wet sand, the length of several steps were separately measured, when forty inches was found to be the average distance between the imprint of one foot and that of the other, the measure being carried from the same place in the one to that of the other, viz., the point of the heel—two steps, or double the distance, forming one stride, being also measured, gave eighty inches.

Another trial was then made by running, and in that a distance sufficient to allow full speed to be acquired was ran, and the steps and strides then measured, as in the preceding trial, when sixty-three inches were found to be the length of the step, and 126 inches the distance passed over by each separate foot from its being lifted until it alighted.

Thus, the full action or stride in the walk gave 6 feet 10 inches, and that of the run 10 feet 6 inches.

Nor do the above figures represent the powers and agility of a Deerfoot or a Mills, but are those of a man sixty-two years of age. Either of the two runners above-named would give a significant addition to the distance attained on the occasion referred to.

I will now return to make some further observations on the progression of the horse.

Supposing that we are making observations on the horses running for the Derby, over Epsom Downs, and that the course be so clear that all can be seen as well as I could study and note the horses on Musselburgh race-course, as they ran round me whilst I was quietly placed on a sand-bank, when I saw Oldminster and Caller-Ou doing their best, stride for stride, in their two races in 1861. And if the Derby horses could be observed equally well, and the eye were educated so that their movements could be followed, it would be found that every horse was implanting one foot at a time on the ground—not four, nor two, but one in succession, and at almost equal distance from one another, the extent or length of stride corresponding to the speed kept up at different parts of the course.

Assuming the Derby course to be one mile and a-half in length,



and allowing for the weight carried and the hill, the winner in the average of years will make 396 strides in the race, which number, representing the action of one foot, and as each foot performs the same exertion, and is implanted the same number of times, it will give 1584 steps as the number of leverage points necessary to win the race, or that which the forward horses in it perform.

Again supposing the same horses to run, with the same weights, on Newmarket Heath, the distance of six furlongs, the number of strides will only be about 177, or 708 steps, the proportionate smaller number being due to the increased speed at which the race is run.

Another example: Let two race-horses run a mile, the one to give the other 300 yards start, and both to be ridden with such knowledge of pace as to enable the last horse to catch the one on the post that started first, when the first horse will be found to have taken an ascertainable number of strides more than the last that started, which ran the ground over in the shortest time.

One of the objects contemplated in the above analysis is to afford a clear view of what gives the stride—not length of limb necessarily, but form, and the measure of force which is exerted on the ground.

The weight of the animal does not entirely represent the degree of pressure which is exerted on the arches of the foot. I believe that the race-horse, taking into account his form and character, and his trained powers, exerts much more pressure on the bearing points of his foot than the heavier horse does in slow work; and, accordingly, we see that the blood-horse has more concave and naturally stronger feet than the common or slower horses. I use the word feet, and not hoofs, because it applies to the whole structure—the arches of bone and sole especially.

In conclusion, I beg to state, that if, in my endeavours to set the actual state of knowledge on the economy of the horse's foot, I have laboured long and ardently, I have to acknowledge that opportunities have been afforded me, which it was as much my duty, as it has been my inexpressible pleasure to cultivate; and in making mention of the helps in my more recent labours, I may truly say that, but for the establishment of the New Veterinary College, I could never have worked out the material which thirty years' practice and observation have enabled me to store up.

The next thing which more directly than any other incident opened up to me new means for settling some pending questions, was the acquisition of the skeleton of Eclipse by the New Veterinary College; in connection with the above incident must be taken the merits due to the late Mr Bracy Clark, for having, out of pure love for veterinary science, preserved so valuable a relic. The late philosophic member of our profession did that which all promoters of knowledge should do, he left his specimens, consisting of casts, bones, and other material, from which he had arrived at his conclusions, not always correct, as may be expected of a man working in a field little cultivated and surrounded by many difficulties.



By the praiseworthy conduct of Clark, who, imitating Hunter, left not alone his books, but his specimens, I have been able the better to read his works and to enjoy his originality of thought, whilst some steps by which his views took a wrong course on practical points have been made evident to me.

By the same means of reference we can see, by the Eclipse skeleton, the totally unreliable work composed by the late Sain Bel. Obscure questions respecting the history of veterinary science during the last hundred years are made plain by these relics.

I have also to acknowledge aid from the work of Dr Carson on the Form of the Horse, in which especially he drew attention to the horse alighting on the posterior region of the foot. Mr James Lupton must share that merit also, he having advanced the same views, and, though later, I believe independently. These opinions published, did good, though they brought out more contradictions than assent; and it was these open and contesting exposures that really made us acquainted with more of the dark side of the questions than could have been anticipated, had not some discussion been elicited.

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The annexed illustrations represent the arches of pedal bone, and the sole of a fore and hind foot. The drawings were executed from transverse sections through the pedal bones, so as to show the arch most distinctly; the section of the whole hoof was made in the same way, transversely from the upper margin of the wall, down throughout its extent, including sole and frog below.

Figs. 1 and 2, show the pedal bone and hoof of a fore-foot.

Figs. 3 and 4, show the same parts of the hind-foot.

On examining these structures, the somewhat different functions of fore and hind feet become more apparent to us; corresponding with the external character, and what may be observed in the action of the horse. The fore foot sustains most weight, covers a larger surface than the hind, and the arch, both of sole and bone, is scarcely so high in the fore as in the hind foot, whilst its breadth and sustaining power is greater. In the hind, again, as we endeavour to interpret its action, we are aided by observing the arched structures, which we find corresponding to the more obtuse exterior point, a more considerable concavity of sole and relatively arched form of pedal bone, and that the hind foot is narrower, more pointed, and more concave—all properties adapting it to embrace a firm hold on the ground.





Fig. 1.

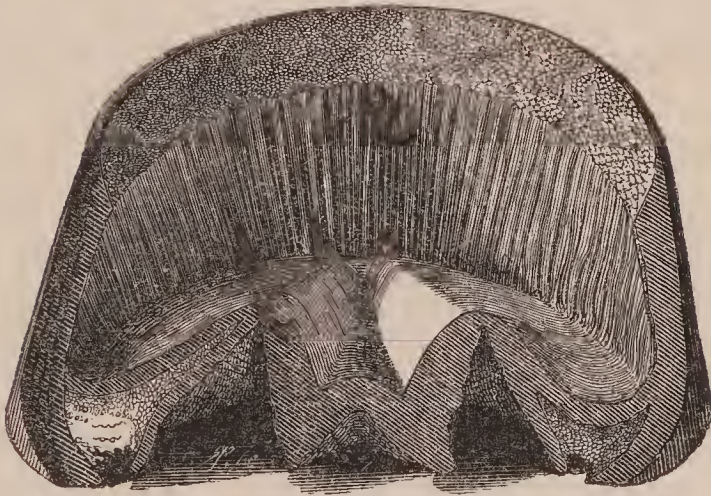


Fig. 2.



Fig. 3.



Fig. 4.



*Importations of Foreign Stock into England.*

NOTWITHSTANDING the prevalence of disease on the Continent, more especially in Holland and Schleswig-Holstein, and the reduced supplies of really good beasts and sheep now on hand for export purposes, the arrivals of foreign stock into this country during the first two months of the present year were on an extensive scale, the total imports having amounted to 22,393 head. This large number was shipped from the undermentioned ports:—

## IMPORTS OF FOREIGN STOCK INTO LONDON IN JANUARY AND FEBRUARY, 1863.

	Beasts.	Sheep.	Calves.	Pigs.
Antwerp, .....	—	—	323	—
Caril, .....	119	—	—	—
Corunna, .....	346	—	—	—
Dordt, .....	19	127	—	—
Hamburg, .....	32	5,490	13	—
Harlingen, .....	2,151	2,182	49	—
Oporto, .....	330	—	—	—
Ostend, .....	—	43	116	—
Rotterdam, .....	2,221	6,215	2,352	18
Vigo, .....	247	—	—	—
Total, .....	5,465	14,057	2,853	18

In order more fully to illustrate the extent of our foreign supplies, we insert the following comparison, embracing the first two months of each year:—

## COMPARATIVE STATEMENT OF IMPORTS.

Years.	Beasts.	Sheep.	Calves.	Pigs.
1862, .....	3,073	7,655	1,639	16
1861, .....	3,124	6,956	1,086	27
1860, .....	3,037	8,704	2,074	63
1859, .....	4,160	13,281	1,990	11
1858, .....	1,146	2,129	1,387	—
1857, .....	3,658	3,767	1,928	—

We are naturally led to inquire into the condition in which the stock has arrived this season, in order to ascertain how much disease we continue to import, and how far we are justified in allowing an admixture of foreign beasts and sheep with our own in the open markets; and this has become the more necessary from the period being pretty close at hand during which large purchases will, no



doubt, be made as usual in the metropolitan cattle market for grazing purposes. We may observe, then, that the merinos reported from Germany, *via* Hamburgh, have reached London in wretchedly poor condition, notwithstanding that some of them have shown signs of crossing with some of our best breeds. They have not, however, exhibited any outward traces of disease; but we do not hesitate to affirm that they are *unfit for human consumption*; and, further, that they have imported the seeds of destruction to our own flocks. What would be said of our native sheep—two and three years old—producing, as is the case with those received from Germany, only from 17s. to 22s. each? The great difficulties experienced in producing even moderately-fat sheep in that country, the great ravages produced by disease, both here and abroad, make it imperative on the part of the Legislature to adopt measures of a stringent character to prevent repetitions of the disasters experienced last year, arising from an unrestricted admixture of foreign sheep with our own breeds. Need we point to Wiltshire and some of the adjoining districts in support of our views embracing necessary caution? Last year, it will be recollected, great alarm was shown in that country, owing to the rapid progress of small-pox. The flock-masters suffered severely from the ravages of that disease; and the consumers of animal food in London and elsewhere were in a state of alarm. What guarantee have we that the same state of things may not prevail this year? Orders in Council are of very little value, when disease has spread itself over a large portion of the kingdom. It can be very little consolation to a breeder or grazier to be told that everything *will* be done to prevent an increase in a particular epidemic; but, if we continue to neglect even ordinary precautions, how is a repetition of last year's severe losses to be avoided? Our impression is, that fully one-third of the sheep imported in the first two months of the present year ought not to have been allowed admission into our markets, because we must bear in mind that disease has frequently shown itself amongst them a very few days after being landed. If, therefore, there is, even at this time of the year, so much danger to apprehend from infection, what may we anticipate in the summer months, however close may be the inspection at the Custom House?

The Dutch beasts have certainly not improved, either in point of quality or condition, and not a few of them have been suffering from congestive lungs—in fact, we pronounce them unwholesome food. Most of them, however, have gone into consumption, as the feeders, almost generally, have declined to speculate in foreign breeds, owing to the severe losses experienced by them in former seasons. The prices realized have been from L.17 to L.22 each—not high rates considering the quantity of fat carried by some of them, though low compared with the value of English and Scotch breeds. But even the increased importations from abroad have had no influence upon the value of any kind of meat. Within the last few weeks, prime beasts have realized 5s. and even 5s. 2d.; and prime sheep, in the wool, 6s.



to 6s. 2d. per 8 lbs., although the supplies have rather increased. The foreign stock continues chiefly to be consumed in poor localities; indeed, very little has come to hand from the Continent of a character fit for West-end consumption.

The advices which have reached us from Holland, Germany, and Denmark, are of a character calculated to give rise to much uneasiness as regards the future. In the two former countries, disease is *very* prevalent; whilst, in the latter country, the cattle continue to suffer much from epizootic aphtha. This may not be so serious as a disease in the lungs, nevertheless, the amount of information from abroad—showing as it does a wide spread contamination—ought to induce great caution on the part of the officials appointed to inspect the stock whilst being landed. On passing through some of the London dairies, we have discovered some additions to the number of Dutch cows in the stalls. We need not dwell upon the *merits* of London milk; but the state in which we have found the cows in question, lead us to the inference that the public health is likely to suffer severely from the introduction of unwholesome beverage. Surely we are not taking even ordinary precautions to prevent infection and loss; but if the public, generally, were aware of the evil effects invariably resulting from inferior food and drink, and the extent of the disease abroad, the Government would be speedily compelled to protect us from a system which threatens to increase the price of animal food immensely, by the wholesale destruction of our material support, viz., our own flocks and herds.

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*Rot in Sheep: Report to the Government on the Prevailing Disease among Sheep in Ireland.* By Professor HUGH FERGUSON, Veterinary Surgeon to the Queen in Ireland, &c.

NEVER, either in the memory of the present generation or the records of past ages, has there been in this country such mortality among the ovine tribe as there is at present, and has been for the last four months, from what is generally designated “Rot,” a disease commencing in the liver, caused by the presence of a worm called the fluke, from its resemblance to the form of the fish of that name, and for the cure of which, in confirmed cases, all medical and sanitary treatment hitherto tried has been ineffectual. Even had sheep small-pox been introduced into Ireland, by inefficiency of the quarantine measures adapted by government against its importation from the seaboard, its ravages would not have proved a quarter as fatal as those already caused by the malady under consideration; on which, in compliance with the instructions received, I now report. The pox affection admits of most extensive prevention by isolation and inoculation, is not as a general rule fatal, and the recoveries from it are permanent, excepting in the occasional instances of impaired constitution from secondary effects.



It would be inconsistent to attempt to embody a full description of the rot malady within the usual limits of an ordinary report. It must suffice to cursorily allude merely to such features of the subject as are absolutely necessary to comprehend the causes of the affection, its nature, its extent, the mortality it has already caused, that which is likely to follow in the future, and the probable effects likely to be produced in the country with respect to sheep as an ordinary article of food for its inhabitants and of export.

*Causes of Rot.*—However conflicting may be the opinions relative to the mode in which pasture that is continually moist operates in the production of the disease, it is a fact, known and admitted by every one having a practical knowledge of sheep farming, even on a limited scale, that browsing on herbage growing on ground the surface of which has been long in a state of moisture, is followed by the sheep becoming rotted, almost as an invariable consequence, excepting when the land is impregnated strongly with saline particles, as in some salt marshes, or that the surface of the soil is completely under water, the level of which is some distance above the commencement of the vegetating stems of the herbage. Although generally the ground favouring the production of rot is naturally humid and comparatively low in relation to that by which it is immediately surrounded, yet, the uplands which, under ordinary circumstances, prove the healthiest pastures for sheep, may, by often repeated, long continuous, and heavy rains, become so lastingly saturated with wet as to be, during the time they are in such a state, as productive of the rot as the worst description of marshy or flooded grounds in ordinary seasons. This was most markedly the case in Ireland during the spring, summer, and autumn of the past year, which accounts for the prevalence of the disease under consideration, even in localities where it had hitherto been unknown.

*Length of Time required for Sheep to Browse on Rotting Ground to produce the Disease.*—Although the assertion may seem a startling one, yet observation and experiment justifies its being stated that, under favourable circumstances, but an incredible short time, sometimes only a few minutes' grazing on rot-engendering pasture, whether it be but an isolated marshy patch, a road-side ditch, or an extensive swamp or bottom, will produce the disease. On several occasions I have tried the direct experiment of selecting the most healthy looking animal of a flock, bred, reared, and never off an upland sheep farm, and bringing it to the marshy ground known to possess the rot-engendering properties, and by allowing it to browse on it for less than quarter of an hour, thus permitted the animal while eating to acquire that which subsequently caused the disease called rot in the system; although the sheep in each instance was at once returned to the flock and pasture from which it had been removed for the experiment, the performance of which, in some instances, did not occupy more than half-an-hour, the rotting ground in a number of cases being a wall-enclosed piece of land, that had once been a



portion of an old deer park, adjoining upland of the healthiest description, upon which the flock continually grazed. The greatest number of the sheep subjected to such experiments became badly rotted, and those that, subsequently to the experiment, showed no symptoms of the disease while living, yet, on examination, after being killed, presented unmistakeable evidence of having, though not to a constitutionally injurious degree, acquired that which, were it more extensive, would most assuredly have caused the full development of the disease.

*Nature of Sheep Rot.*—The generally recognised disease has its origin in an affection of the liver, in the biliary passages and gall bladder of which there are found a number of living worms of a flattened, elongated oval form, called “flukes,” from their shape resembling that of the small fish usually known by that name. It has long been a disputed question whether these worms, found so numerous and almost invariably in the gall passages and reservoir of the liver of sheep affected with the rot, are the cause or merely an effect of the disease. That they are the cause and not an effect admits of no doubt, as a result of careful and extensive observation. How they produce the disease is, by their presence in the gall ducts causing such irritation in the liver that its structure becomes affected with chronic inflammation, which shortly produces such changes that its functions become deranged, and as a result, in time, the derangement becomes so extensively constitutional as to impair the powers, and eventually cause a cessation of vitality, or, in other words, leads to a fatal termination. The liver is a most important organ. The proper performance of its functions is most essential for the process of digestion and the assimilation of those portions of the food destined for the support of the animal system. It is not the object of the present report to enter into a detailed account of the manner and different stages by which the changes from health to disease are brought about by the presence of fluke worms, when they are numerous in the liver of sheep. It must suffice to confine the observations to proven facts of such a nature as to be generally understood, without the mystification of professional jargon, or the entering upon points the elucidation of which is, as yet, wrapped in obscurity, and the description of which would be more curious than practically useful. Nor is it necessary to detail the symptoms by which the disease is recognised, so generally and well known are they throughout the flock owners and their servants of the agricultural community.

How these fluke worms get into the gall ducts of the liver is also a matter of dispute, some imagining that they are generated within the organs as a result of this disease; others, and with reason, contending that they gain access to the interior of the animal through the medium of its food when it is collected from localities such as those already described as productive of rot.

The fluke worm procreates or continues its species by the egg-generating process. Some imagine that the eggs come to maturity



within the liver, in due time becoming flukes after having been expelled from the parent. Others assert that the eggs, after being expelled from the parent fluke, pass with the bile into the intestines, and through them with the food, and are eventually expelled with the excrement, to be disseminated by the rains and other wet over the ground among the herbage, with which they are taken up by the sheep while feeding, and hatched in its interior, to obtain access to the gall ducts of the liver, the place destined by nature for their proper and full development. The dung of sheep affected with liver rot, at certain periods of the year, contains innumerable quantities of the fluke eggs that had gained admission from the liver into the intestines. It might be, and is by many, imagined, that the eggs thus deposited on the ground with the excrement, and dispersed by wet over its surface, on again being taken up with the herbage collected by sheep as food, cause fluke worms in the livers of those animals, into the interior or digestive organs of which they thus gain admission. However plausible this explanation of the mode in which fluke worms obtain admission into the sheep, it is erroneous. No matter what quantities of fluke worms are collected and given to a sheep, either by being mixed with its food or in the form of a bolus or drench, they will never produce flukes, or come to perfection, under such seemingly favourable circumstances. The experiment of trying to develop fluke worms in this manner has invariably failed, much to the astonishment of the generality of investigators.

To understand the cause of failure to produce the sought-for and expected results of these experiments, it is necessary to be aware of the fact that the fluke worm belongs to a class of animals, the immediate productions of whose eggs bear no resemblance whatever to the parent worm, and require for their development and the continuation of their existence that the circumstances under which they are placed be of a particular nature that is not at all similar to those which were necessary for the well-being of the source from which they sprung—the parent fluke worm, whose allotted place in the animal kingdom is the gall ducts of the liver.

If, in the early part of the year, fluke eggs are collected and placed on a damp surface, exposed to air, as that of a piece of blotting paper floating on water contained in a shallow vessel, and that they are watched daily, it will be observed, on microscopic investigation, that in a couple of months creatures endowed with vitality, though bearing no resemblance whatever to fluke worms, are present as a result of escape of the contents of some of the eggs by this process of artificial pneumo-hydraulic hatching. Also, that they become the parents of another succession of living creatures as unlike themselves as they were to their own parents, the liver fluke, from the eggs of which they had first derived their vitality. Such observations require to be conducted with great care and untiring patience, and to be continued over a space of time extending to even years. Mr J. B. Simonds kept one batch of fluke eggs under observation for upwards of



two years, and only succeeded in recognising two generations from the egg, each of which was different from the other. How many more changes have to be undergone before there is a creature formed to find its proper habitation in the liver of the sheep or other animals is a question that hitherto has baffled research. But sufficient of the history of the fluke worm has been already discovered to prove that, though an egg-generating creature, its eggs cannot be hatched within the body of a warm-blooded animal, and that that which they produce must undergo many further transformations before there is the particular creature formed which, on being collected by sheep with the vegetation eaten off a humid locality, is to become, as the last stage of developing perfection, the fluke worm inhabiting the gall ducts of the liver. Nor as yet has it been ascertained what is the particular form of the creature taken into the digestive organs of the sheep, to become by its last change the fluke worm of the liver.

So numerous are the different kinds of minute living creatures, generally called "animacules," found attached to the stems of the herbage and on the surface of such ground as causes the rot in sheep, from their feeding on it, that as yet there is no certainty as to the characteristics of the particular animalcule which becomes the fluke worm, and by its presence in the liver causes the derangement which leads to the disease called "rot." Many of the animalcules found in such places resemble those which proceed from the egg of the fluke worm, and many more present a greater and higher extent of animal organisation.

The setting aside of error is an advance towards the elucidation of truth. And although recent investigations have not succeeded in tracing the development of the fluke worm throughout its changes and different modes of existence, from the egg that passes from the interior of the sheep with the excrement, to the perfect fluke worm, as found in the animal's liver, yet sufficient is known to be practically available towards deciding the true nature and causes of the disease called "Rot."

Many, as has been stated, are of opinion that flukes, instead of being the cause of diseased action in the liver, are merely the necessary consequences of a debilitated and watery state of the animal system, caused by the humidity of the herbage used for food. This theory is set aside by the well-known fact that, in many instances, it requires but a single meal collected from a rot-engendering locality to, in a short time, produce the disease in a previously thoroughly healthy sheep, although the animal, after but once having partaken of the disease-engendering food, may have been immediately placed on the best, driest, and soundest of upland, where every other sheep, excepting those that have browsed on the rotting locality, continues sound; while those who have fed on it have become shortly affected with rot. Repeated attempts have been made to cause the existence of flukes in the liver, by giving food saturated with water to house and pen fed sheep, but always without success.



Occasionally, though very rarely, the liver of the sheep gets diseased, even when the animal has always been fed on good, sound, upland pasture; and the constitutional symptoms of fluke rot present themselves, without there being any trace whatever of the existence of flukes in the liver, which would not be the case were it true that those parasites were the result of disease, instead of another cause.

Another argument against the theory of flukes being a result and not the cause of the disease is the fact that it is by no means unusual to find a few flukes—sometimes perhaps only one or two—in the liver of an animal perfectly healthy in every respect, even the liver itself presenting no diseased alteration of structure.

*The presence of flukes in the liver not always productive of rot.*—The statement made in the last paragraph is a well-known fact. If the sheep be strong constitutioned, and remaining for a continuance on good sound, dry upland, the presence of a very small number of flukes are generally found insufficient to cause its structure to become diseased.

*Extent to which Irish flocks have been lately and are at present affected with the disease.*—To decide with any degree of accuracy the extent of the fluke malady existing at present, and that existed during the past year, would be an impossibility. Were the question to be solved by the state of the animals sold as butcher's meat in this country, or exported for that purpose, it would be far under the real average to state that three-fourths have been and are diseased. But the per centage of diseased compared to sound sheep that have been brought to the shambles, is not a fair criterion as to the amount of disease existing in this country. In consequence of flock-owners invariably, when it is possible, disposing of their unsound sheep as soon as they discover that are affected, the markets have been oversupplied with such animals; those sheep that are sound being retained as stock. It, however, is my opinion that upwards of 60 per cent. of the sheep in the island are at present unsound, though not at all to a fatal extent. The per centage of rotted sheep has considerably diminished within the last three months, in consequence of the vast numbers of them that have either died, or to prevent a naturally fatal termination, have been forced into the markets.

*Mortality of rot.*—Although the present report is not intended to embody any recommendations relative to the treatment of animals affected with the malady under consideration, it may be deemed desirable to make allusion to the fact that, although as yet no means have been discovered of destroying what may be considered the very essence of the affection—the fluke worms in the liver, yet their effects upon the system are modified by circumstances, and frequently counteracted by sanitary measures; the most successful of which has been found to be change of pasture to what is usually designated sound land. The salutary effect of such a change is by no means certain. It frequently fails to re-establish healthy action, and if the fluke worms have already caused much disorganisation in the liver, will



invariably do so. By judicious selection of the feeding grounds, if the season be a favourable one, the destructive effects of the fluke worm are often averted. It will be frequently found that sheep, in the incipient stage, though evincing unmistakeable symptoms of the affection, become restored to health from change of pasture alone. When such a favourable change occurs, it indicates that the system has become stronger and better able to resist the deranging effects of the parasite; not that the fluke worms, the cause of the evil, have been banished from the ducts or gall passages with the liver, for, despite of every known treatment, medicinal or otherwise, they remain uninjured in the gall ducts or canals of the liver.

Turpentine, being inimical to vermiform life, is very generally given with the view of destroying the flukes in the sheep's liver, as it undoubtedly does many worms inhabiting the intestines of other domestic animals, as well as of man, in all of which the medicament comes in direct contact with the parasites, and thus effects their destruction. But no matter however great the dose of turpentine given to a sheep, it affects not the vitality of the flukes within the animal's liver. It is easy to force the turpentine into the sheep's stomach, even to the extent of producing death; but it is impossible to make the fluke worms partake of it. The turpentine, before any portion of it is secreted with the bile on which the fluke worms live within the liver, becomes immeasurably diluted and changed in its character while passing through those portions of the circulatory system of the blood intervening between the stomach and intestines, which receive the medicines when given, and the secreting structure of the liver from which is derived the bile in which the flukes remain during the naturally prescribed period of their matured existence.

I have for several weeks given full doses of turpentine twice daily to sheep affected with rot, and invariably found that it produced no discoverable injurious effect on the vitality of the flukes. In some experiments turpentine was given continuously to such an extent that it eventually produced a fatal effect on the sheep, but not on the flukes, which were found, whenever the examination was made before the body had time to cool, alive and seemingly uninjured in the gall ducts of the turpentine-poisoned animal. No medicine or treatment as yet discovered has the effect of destroying the fluke worm as long as the sheep lives; once it is habited in the liver there it will remain during the rest of its natural length of existence. As has been already explained, the effects produced in the system are modified by circumstances, such as the number of the parasites and the ability of the sheep's general health to resist their influence, which has been found to depend greatly on weather, season, and peculiarity of pasture, temporary or permanent. The results of changes of food and grazing locality, for either the better or worse, depend not alone on the natural peculiarities of the individual animal but also on the amount of diseased structure and deranged functions already caused,



as immediate effects or secondary results, by the existence of the fluke worm in the liver. The mortality is great in ewes in lamb. The disease is productive of great debility, and renders the blood of the parent unfitted for the proper development of the embryo young within her womb, the maturing powers within which organ become so insufficient that abortion is a frequent occurrence. Even in cases where the lamb is not dropped till the full period, it is weak, sickly, and unprofitable to the breeder, generally dying shortly after birth, seldom living many days, the ewe being unable to nourish it sufficiently to give it strength enough for its being reared.

The lamb of a ewe affected with rot is frequently dropped with that exaggerated flabby state of the young tissues that corresponds with the state of the parent's frame; yet it is worthy to remark that no appearance of fluke-worm is ever observable in the newly-born lamb's liver, which, to some extent, may be regarded as corroborative evidence that flukes are not the result of the impoverished state of the system in rot, but rather the cause of the malady. Negative evidence is frequently very confirmatory in the investigation of disease.

During the past season many sheep evidently affected with rot were observed to die with a suddenness unusual in that disease. On examining them after death, it was found that the vessels had given way, most frequently in the liver, but occasionally in other parts, causing an effusion of blood, which, being thus taken suddenly, and, comparatively speaking, in a large quantity from the circulation, caused death as effectually and rapidly as if it had occurred from external hæmorrhage. There being such a diminution in quantity, as well as deterioration in quality of the blood as a result of rot, the escape of a small quantity from the circulation produced a suddenly fatal termination.

If the number of sheep that have been prematurely forced into the market on account of being diseased, and those which stock-owners were compelled to dispose of for the same reason, though they had intended to keep them for breeding purposes, be taken into consideration, as well as those that were permitted to die naturally from the malady, the amount of mortality caused by the rot during the greater part of last year, and up to the commencement of the present month (March) of this one, might be consistently computed as already amounting to upwards of seven-eighths, or as great a number as have been consumed and exported for human food within that time.

*Future effects likely to be produced by the last attack of the disease.*—No correct idea can be formed by the present price of mutton, and what it has been for the last six months, as to the effects that will be produced by the disease on sheep as human food, with respect to the quantity which will be available when the markets shall have ceased being over-supplied, as a consequence of the desire to dispose of animals that are unfit for stock. This excess of supply is, and has been, a necessary consequence of the extensive existence



of the malady among the flocks. The market prices have been regulated by the amount of supplies. The latter has been, from the reasons assigned, exceedingly great; consequently, the average prices are proportionally small, excepting for thoroughly sound animals, with which the markets have been but scantily supplied. It, however, is a certainty that the inevitable result of the late and present epizootic attack of rot will be a scarcity of sheep and a proportionate increase of their value throughout the following summer and remainder of the present year. According to the Government statistics at the period of their being taken, there were 100,163 sheep less in Ireland last year (1862) than there were in the year previously (1861).

From the great ravages committed by rot during the latter part of last year, subsequently to the collection of the information from which the Government statistics are derived, the amount of deficiency in sheep must have been many fold greater on the termination of the year than the published statistical report would imply. In 1851 there were 3,556,050 sheep in Ireland. In 1862, last year, at nearly the same period, when the rot had not thoroughly set in on its work of destruction, there was a deficiency of 100,163 from that number. That deficiency was incalculably increased during the remainder of the year by the ravages of rot. There will be a still far greater amount of deficiency this year—an amount which I believe will be found greater than had ever previously occurred in any year within the memory of the present generation, and certainly within the period of the Government collection of agricultural statistics. As well as the number that have already perished by, or been prematurely slaughtered on account of the rot, the inevitable deficiency of lambs this year should be taken into consideration, not alone from the great mortality that has occurred among breeding ewes, but also from the frequency of abortion. There being a large per-centage of twin lambings, of course the destruction in abortions is proportionately increased, and there must be a deficiency of lambs to a much greater extent than of older animals.

#### SUMMARY OF THE ABOVE REPORT.

The disease which, for the last eight months, has been so extremely destructive to sheep in Ireland is rot.

The cause of the malady is the fluke worm in the liver.

Its prevalence last year is attributable to the heavy, continuous, and widely-spread rains throughout Ireland during that period, rendering most even of the best uplands unsound for sheep.

The disease is neither infectious nor contagious.

No means have as yet been discovered by which the parasites, the existence of which in the liver causes the diseased action, can be destroyed or eradicated.

In such continuous wet seasons as those of last year, no feasible



sanitary measures can be adopted to arrest the progress of the malady.

A great deficiency of sheep in Ireland must be the effect during the present year, and, consequently, a comparative high price of mutton as an article of general food.

The malady is of such a nature, and so little under human control in such seasons as the now nearly past winter, and the summer and spring that preceded it, as well as not being infectious or contagious, that it presents no aspect in connection with it requiring Government interference, or capable of amelioration, excepting with respect to its being certain to cause during the remainder of the year a comparative scarcity of an article of animal food extensively used by all classes of the population.

*On Joint-Ill in Cattle and Sheep:* Being an Essay to which the Premium Gold Medal has been awarded by the Highland and Agricultural Society. By JAMES M'GILLIVRAY, V.S., Rayne, Aberdeenshire.

#### PRELIMINARY REMARKS.

IN writing on diseases of animals, more especially when such writings are principally intended for the benefit of non-professional persons, if there is one rule of more value than another, and which as anatomists and pathologists we should always keep before us, it is, to explain the pathological changes which we meet and detect in the course of our investigations in terms so plain, distinct, and explicit, that they may be understood by all, and to name the various features of disease as much as possible in accordance with their pathological character.

In the present time, thanks to the more general diffusion of intelligence, professional matters are not so obscure to the general reader as they were a few years back, consequently it is easier to write *now* on physiology and pathology than it was in former times.

Keeping these observations constantly in view, I shall endeavour to explain in what pathological changes of structure diseases of joints in the lower animals consist, as commonly met with in an extensive country practice, and over a number of years.

#### STRUCTURE OF JOINTS, AND THE NATURE OF JOINT DISEASE.

Without exception, every normal sound joint is a closed cavity, impervious to the external air, the internal lining membrane of which belongs to the class called *serous* membranes; its purpose, in health, being to supply the joint or articulation with a lubricating fluid vulgarly called the joint-oil or synovia, and is itself named the synovial membrane. Nature by furnishing this fluid facilitates the motion of the joint, and prevents the friction of its different parts during progression, &c.



The extremities of all bones forming joints or articulations are covered by a firm substance called cartilage, having a beautiful hyaloid articulating surface. All joints are partially held in position by a ligament that embraces the whole of the joint, named the capsular ligament. The synovial membrane already referred to lines the interior surface of this capsular ligament, and is reflected over the articular cartilage—thus, as has been said, forming a closed cavity.

The joints of animals, being constructed of many and delicate parts, and, moreover, being frequently subjected to inordinate action, might naturally be supposed to be subject to many and various affections and injuries, all resulting in disease: *and such is the case*. In the following paper the writer proposes giving part of his own experience, personal and acquired, on the above-named subject—diseases of the joints in cattle, sheep, &c.

In accordance with the observations now made, in practice there are found many sources and varieties of joint disease. I have referred the principal to five heads: *first*, Tubercular Diathesis; *second*, Idiopathic Synovitis; *third*, Deposit of pus in joints from sources within the body; *fourth*, External Injuries, the result of accidents, &c.; and *fifth*, Rheumatism. By some this division may be regarded as arbitrary, or more convenient than *real*—as, for instance, general rheumatism may be accompanied by, or pass into synovitis; again, any severe injury to the joint, such as a blow, a sprain, or puncture into the cavity, &c., will most likely produce synovitis in that joint; and again, synovitis, when allowed to go on unchecked, rapidly produces, or passes into, other and more severe affections—such as suppuration, the result of purulent inflammation, followed by ulceration of the synovial membrane, periosteum, and bone, &c. Thus disease of the synovial membrane is the primary *tangible* form of almost all real joint disease. Besides these, there are other incidental matters, such as the urachus remaining pervious and containing pus, phlebitis, &c., which I shall refer to in giving cases in practice, &c.

Under inflammatory action, from whatever cause, the first change that takes place in the secretion of the synovial membrane is not well understood; however, the membrane, having the characteristics of other serous membranes and closed cavities while in a state of health, may be fairly supposed to exhibit the same pathological changes under inflammation as they do. Such being the case, then, the cavity of a joint in the earliest stages of simple inflammation has its natural secretion arrested. I have no decided experience, however, whereon to establish this as a pathological fact, and give it as a probability merely.

The first positive result which we meet is an excess of secretion—every opening between the bones becomes bulged out, distended, prominent, and tender; there are exceptions, in a few chronic forms, where, in cattle that have wrought, the distension is permanent and not painful.



In acute cases of synovitis, flocs or shreds of stuff resembling coagulable lymph are found adherent to, and scattered over, the internal surface of the synovial membrane, covering the capsular ligament, and, in some few instances, I have found the same substance on the synovial membrane covering the cartilage. The fluid contained within the cavity of the joint is very soon either wholly converted into, or is much mixed up with pus. In all such cases there is extreme pain evinced on pressure or the slightest attempt to move the joint; and, in some cases, the synovial membrane will be found ulcerated, easily torn, and its integrity and structure all but gone.

I have already stated that on the ends of bones forming the articulations, and under the synovial membrane, there is an intermediate substance deposited, named cartilage. These cartilages belong to the class of tissues called, in pathological language, *non-vascular*, and are themselves very sparingly, *if at all*, supplied with blood-vessels, and that on the surfaces only—certainly they do not assist in circulating or conveying the blood to other tissues. The substance of cartilage is itself nourished partly from the synovial membrane, but principally from the bones to which, in health, it is attached; this is proven by the trustworthy and minute investigations of Toynbee, Bryant, and others. There are before me, prepared by Mulder, Donders, and others, between fifty and sixty specimens of cartilage from various parts of bodies, some of them prepared by maceration in simple water, in sulphuric acid, in muriatic acid, in ether; exhausted by ether, by acetic acid; by maceration in solution of potash; also dried cartilage and transverse section of same. These specimens are magnified from 120 to 410 times, and exhibit the natural structure in health, and the altered structure in various states of different diseases. I have also examined for myself various specimens of cartilage under the microscope—with powers ranging from 100 to 700 diameters—exhibiting the cells with nucleus and nucleolus, cartilage bodies in lines with nuclei enclosed, the beautiful hyaline substance in healthy cartilage, &c. I never could discover, however, the smallest trace of a blood-vessel or blood in cartilage; still there are physiologists of a very high class, that record having seen them.

There are at least two primary forms of cartilage, named respectively the *true* and the *fibrous* cartilage. All the cartilages covering articulations belong to the class of true cartilages; and, in the mean time, it is with them only we have got to do.

The blood-vessels on either side form loops just in contact with the cartilage; and thus the cells of the articular cartilage *imbibe* their nourishment from them. Plain it is, then, that these non-vascular structures which derive their nourishment by *imbibition* from the blood-vessels of other tissues must depend on the integrity and healthy action of those tissues; and if at any time or from any cause the primary nutrition is interfered with—either diminished in quantity or vitiated in quality—then the cartilages must suffer. In many



cases of joint disease they are atrophied ; in others they are loosened from their bony attachment or from that of the synovial membrane, and in this detached state they are dead matter, act injuriously as foreign bodies in the joint, or may be slowly dissolved—the pus in the joint acting as a solvent. When they completely disappear, I may mention that their non-vascularity prevents their inflammation ; neither can they ulcerate. Much has been written about the ulceration of cartilage ; I believe there can be, strictly speaking, no such thing.

I have also before me many examples of bones examined under high magnifying powers, from 25 to 410 diameters, and carefully manipulated by Von Bibra, Scheerer, Donders, and Mulder. I have also, myself, examined several specimens of bones, under microscopic powers ranging from 100 to 700 diameters. Scientific investigation has recently proven beyond doubt that during health the effete, worn-out substance of bone is removed by absorption into the blood circulation : the substance of bone is liberally supplied with blood-vessels, and has an active circulation ; this absorption and consequent discharge being immediately preceded by a process of interstitial decline and death in minute particles within the substance of the bone ; and the place that was lately occupied by this now effete, dead matter, supplied from the same source—the living organism, the blood circulation.

It need be no surprise, then, that organs in which there is constantly going on vital actions, so rapid in their progress, so delicate and essential in their nature, should be at times deranged in their functions, especially from attacks of inflammation ; and that these inflammatory attacks, if severe, prolonged, or often repeated, should prove destructive to the integrity of the bone or bones in which they take place.

The first direct evidence that I have seen of disease of bones is the unnatural enlargement of their articular extremities. I have often met with them enormously enlarged, especially in disease of the stifle-joint—generally both the lower extremity of the femur and the upper extremity of the tibia ; I rarely met with a case in which the patella is involved farther than that its articular surface will be affected. Again, when the hock-joint is the seat of the disease, along with all the bones of the joint, the *os calcis* never escapes—it often is so diseased that the insertion of the tendo-Achilles gives way, and of course the leg is utterly useless. I have repeatedly met with cases where the inflammatory action ran so high or continued so long in the bone that partial death of it was the result ; and, knowing that no good cure could be effected while the dead substance remained within the living organism, I have occasionally removed necrosed bone from various diseased joints of cattle, and they have uniformly healed readily after.

Cartilage is never under any circumstance reproduced ; and if we have reason to believe that the cartilages of a *joint* are destroyed,



*gone*, then the joint as a joint is gone also ; no process or treatment can restore its integrity. Bone is, however, very readily reproduced ; and, if we can bring about a healthy *action* in the joint, we may have the beast perfectly able to collect its food, and in every way suitable for feeding or fattening—with a stiff or ankylosed joint, the result of the reproduction of bony matter in a plastic and healthy state.

My experience goes to prove that in cattle a very well-marked distinction exists between joint diseases that follow and are apparently the result of rheumatism, and joint diseases that accompany a strumous diathesis ; true, these two may be complicated in one subject, but this I have not found to be common. In joint affections that belong to the rheumatic, the soft parts about the joints are only affected, at least for a considerable time—the synovial membrane all over, and the ligaments slightly. I have met with cases of this kind, where the animal could scarcely stand, and still there was very little distension about the joint, and certainly very little heat externally ; internally the joint was diseased, and in almost every case I found *matter*, *pus*, formed in the cavity. Moreover, in the rheumatic patient several joints are often affected at the same time, while in the strumous patient I have rarely seen more than *one* joint affected at once ; and in these latter cases the disease apparently commences in the articulating surfaces and the extremities of the bones—among the first symptoms being their enlargement, the result of inflammatory action.

I may here mention that I have never met with joint disease resulting from rheumatism in the sheep. All the cases that I have met with in sheep were in animals affected with tuberculosis. In the last case of a diseased sheep that came under my notice, and which I particularly examined, I found the bones completely spoiled—they were quite black on both sides of the joints ; and, on cutting up the carcass, I found tubercles in clusters about the lungs, the liver, the mesentery, the kidneys, and bladder—in fact every way excepting about the heart. From my experience I would infer that sheep are not so liable to rheumatic affections as they are to strumous diseases and their resultants, &c. The truth is, the *coat* and the *carcass* of the sheep being in most cases worth something to the owner, more of them—that is, a greater proportion of sheep than of cattle—are slaughtered when there is anything amiss with them, and, consequently, there are not so many of them brought under treatment as there are of cattle. I believe this state of matters, this practice, may be right and proper, as sheep, from their circumstances, their habits, and the organic arrangements of their bodies, are not so amenable to treatment as are cattle. On the whole, I consider them more healthy than cattle ; and, if we except the single disease of foot-rot, sheep are not so subject to local diseases as cattle are, the diseases that they suffer from being in most cases constitutional. In diseases of joints, whether purely local or constitutional, absolute *rest* to the affected animal is necessary if it could be had, but the habits of the sheep are



ill adapted for the accomplishment of this indication. Indeed, in the swellings that occur about the knees in lambs, rest and frequent warm fomentations is often all that is required to put them to rights.

Any small matter that I have now passed over in the description of the diseases will be brought out when I give illustrative cases, their treatment, and its results.

#### REMOTE CAUSES OF JOINT-ILL.

From observations made on the manner and frequency with which joint diseases occur amongst cattle, I am led to form the opinion that there exists a constitutional tendency among cattle to disease of joints; and that this tendency is most evident in what is called the pure short-horn breed, next in crosses between them and the different black breeds, and crosses common to Scotland. A strumous diathesis, or a tendency to tuberculous consumption and rheumatic affections, are the most common, and are clearly communicable from generation to generation, from sire to son, as are certain points of external conformation; which fact is well known to every intelligent breeder of cattle, and forms the basis of improvement in breeding—“*like produces like.*”

There is before me a letter from an extensive farmer and successful practical breeder of cattle; in this letter he writes:—“With the progeny of a single cow I have taken fifty prizes. I have taken first prizes at every show where I was an exhibitor—on the Continent, in various parts of England, and in Scotland.” Now it is evident that the excellences of this cow were transmitted from her to succeeding generations; and there cannot remain a doubt in the mind of any sane man but that bad qualities, whether in conformation or constitution, will also, on the same principle, become transmitted from one generation to another. At a farm not many miles from the place where I now write, the farmer, Mr A., had a sale of bulls during last February. These bulls fetched long prices, but they have not all turned well out, a few having been lost from joint disease. Another farmer, Mr B., has a farm in a totally different part of the country. Some few years ago, this Mr B. purchased a shorthorn bull at a sale then held by the aforesaid Mr A. During last February Mr B. also had a sale of shorthorn bulls, the progeny of the bull purchased by him a few years back at the sale already referred to. These bulls also brought high prices, and, according to authentic report, they have also turned out badly. The objects of both sales were, of course, from the *same stock*; and, although raised in different parts of the country, and most likely under different circumstances, and subjected to different treatment, yet are found exhibiting the same phases of physical character, and the same tendency to disease clinging to the family from generation to generation—some exciting cause being only necessary to develop the disease, in such cases the seeds being latent in the constitution.

From this circumstance and similar ones that might be given, it



will easily appear how necessary it is to get the antecedents of a stock before one purchases from it animals of considerable value, more especially to breed from. The shorthorns, being natives of a warmer climate than Scotland, do not withstand the vicissitudes of Scotch weather so well as could be wished.

Another cause of weakness in certain families of cattle is said to arise from the breeding *in-and-in* system; that consists in breeding from near relations, such as a bull serving sisters, &c. I do not pretend to give an opinion with certainty on such cases; we are not in possession of data sufficient to enable us to form a correct opinion on the merits, &c.; but, judging from corresponding features in breeding, one would imagine that whatever formed a source of weakness or of strength in the family would be perpetuated by the system; we can, however, scarcely conceive how the mere fact of breeding from relatives in the brute creation should *give rise* to constitutional weakness, or be the means of *producing* and perpetuating animal imbecility.

#### PROXIMATE CAUSES OF JOINT-ILL.

Where there may exist any tendency to a tuberculous diathesis, one fertile source of its development is damp, ill-ventilated, dirty-kept byres. In such ill-assorted places calves are often confined for weeks and months, are never allowed exercise or a mouthful of fresh air; the stalls are not cleaned once a-month, and, consequently, such calve-houses are so abominably foetid and disgusting, that nothing but sheer necessity would make a person enter them. Animals cannot live in such places and escape disease—scarcely if they were originally sound could they escape—such circumstances being amply sufficient to gender and give rise to, or lay the foundation of tubercular and rheumatic affections. In the “Cyclopedia of Practical Medicine,” at page 316, vol. iv., Sir James Clark says:—“Most of the milch cows in Paris become tuberculous after a certain period of confinement to the house; and we have been informed that, for some time after the disease has commenced, the quantity of milk obtained from them is greater than before, and their flesh is more esteemed by the unsuspecting epicure than that of the healthy animal.” This shows the danger of confinement, and the insidious nature of the disease.

I have seen rheumatism in various forms, and complicated with or resulting in joint disease, in over 547 cases of animals of the cattle kind, none of them more than six months old when first affected. I have also met with cases of disease of lungs and joints in animals subjected to confinement. I have had bad cases of rheumatism and disease of joints brought on by the young calves being confined closely for a considerable time, and then turned at once from a comparatively warm house into an exposed park—many enclosures having no shelter, the fences being simply a wire paling—there to remain in cold weather and hot, by night and day. Again,



I find often when calves are kept tied up in filthy and close dark houses for many weeks, all at once the owner turns them out to perfect freedom; the young creatures are wild, and, if able, gallop round and round until they tumble over, or until some accident happen to them, or they are perfectly exhausted; and the next day they have rheumatism, are scarcely able to move; in a few days more one leg is dangling useless at the animal's side, and, on examination, one or more of the joints are found hot, swollen, and exceedingly tender.

I have also met with neglected or spoiled cases of foul-in-the-foot, resulting in disease of the joints. When a bad case of foul-in-the-foot is neglected—and any case may be made bad by neglect—left without proper cleansing, or the necessary medicinal applications, then the disease works itself up between the digits until one or more of the joints, generally on one side only, become affected. Often the joint between the coffin-bone and the os-corone, sometimes the joint between the os-corone and the pastern bone, or perhaps both of these joints are involved. I have found them so badly affected that I have removed the navicular bone, it being dead matter, freed from all its attachments by the disease about the joint, the cases doing well after.

I have on record a case of injury to the stifle-joints of two valuable cows, the property of one gentleman. This gentleman's byres were laid on the floor with wood; on this wood the cattle stood day and night. The plan was said to save much straw, and keep the cattle comfortable indeed. Whether there was anything faulty about the construction of the wooden floor in this byre, I am not aware; but certain it is that, when these heavy cows were getting up, often their hinder legs would slip from behind them, they dropped on the belly, and the stifle-joints came in violent contact with the wooden floor. By repeated bruises of this nature the animals became so diseased in the joints that they were both destroyed.

And I have often met with diseased knees in cows, the result of rising with their knees in contact with rough bare stones.

In cattle having a constitutional weakness, or a natural tendency to disease—say a strumous diathesis—joint affections are much more easily induced than in others having a hardy constitution. On the latter, ordinary exciting or depressing causes have little influence, at least not a lasting or ruinous effect; while the scrofulous beast is in imminent danger from every exciting or depressing circumstances—such as low, damp, ill-ventilated houses, where the want of good air and cleanliness induces a close and suffocating atmosphere, &c.—a want of the necessary amount of exercise—moderate or slight injuries; these are a few of the commonest sources of the development of joint diseases; and, but for such proximate causes, the disposition might remain dormant in the constitution during the life of the beast.

And, again, idiopathic, spontaneous disease of any organ may be



the result of a faulty or deficient nutrition. This may be due to improper feeding; the food may be meagre in quantity, or deficient in the necessary elements, to afford the nourishment required by the various organs, tissues, &c., of the animal system. The natural operations of nutrition and change of materials that are constantly at work in every healthy body constitute together *one whole action*. Dr Carpenter writes:—"The abstraction of the material required for each part leaves the blood in a state fitted for the nutrition of other parts—proves that such a mutual dependence exists amongst the several parts and organs of the body, as causes the evolution of one part to supply the conditions requisite for the production of another." And, to use the language of Paget, "The development of each organ or system, co-operating with the self-development of the blood, prepared it for the formation of some other organ or system, till, by the successive changes thus produced, and by its own development and increase, the blood is fitted for the maintenance and nutrition of the complete organism or animal body." The self-development of the blood here referred to, can only take place in complete accordance with the materials supplied to the animal in the matters of food, water, air, and exercise. The power of the animal system to elaborate the materials furnished, so as they may form integral portions of its own blood, greatly depends on its being allowed the necessary amount of exercise in a healthy place. If the stockmaster wishes to preserve a healthy stock, he must study to know and fulfil these conditions.

#### TREATMENT, AND CASES ILLUSTRATIVE OF SAME.

The first and most simple appearance of joint disease that I find among the lower animals, occurs in calves from four weeks old. Often about that age, or after, the little animal is found some morning attempting to stand or walk on three legs—the fourth dangling useless by its side. On examining this useless limb, one joint is found *enlarged, hot, and tender*; if a hind leg, it is commonly the stifle or hock; if a fore leg, it is commonly the knee or shoulder-joint that is affected. Generally, within two days of the first attack, the soft parts about the affected joint will be found puffed out; this is due to an increased quantity of the fluids about the joint distending the capsular ligament, which in this state bulges out at every opening between the bones of the articulation. Although the joints now mentioned are the most common seats of this affection, occasionally it will be found in any joint.

If the breathing is hurried, and unmistakeable symptoms of fever are present, then I abstract a quantity of blood corresponding to the degree of fever, the age and size of the affected beast, and give laxative or purgative doses of medicine as the case requires. In severe cases this treatment may require to be repeated; in prolonged cases, again and again. The fever must be kept down, and the bowels kept under the action of medicine as long as there is any constitutional disturbance present; this is necessary whether the animal be young or old.



If the case has been neglected, or if stimulating medicines are applied—which country people are apt to do—the joint commonly suppurates, its integrity is destroyed, and the animal, or *limb*, so affected often rendered useless. So soon as a case such as that now described occurs, the cooling evaporating lotion, No. IV. (page 234), should be applied, and this cannot be too frequently done; no friction to be used, and no covering put on the affected part. The *modus operandi* of this lotion is—that spirits evaporate, reducing the temperature; and the strong vinegar, formed by the acetic acid and water, keeps the parts cool, and, in the great majority of cases, reduces the inflammation altogether. I repeat that, where this application is sufficiently early had recourse to, and duly persevered with, I have never had a single case but was *improved* by it, and comparatively few but were completely cured; and I have prescribed it for more than five hundred patients.

If I meet with cases that have been neglected or spoiled by stimulating applications, but no suppuration present, then I have found most benefit by passing setons over the affected joint. The instrument named the seton-needle, proper for the insertion of setons that pass over joints, requires to have a peculiar shape, should be about 10 inches long, a good deal bent; a pretty large eye in each end, with a blunt point—what is called a “probe point.” This instrument is let into the skin by making a wound of about half an inch with rowelling-scissors; and, after the needle has traversed over the joint, beneath the skin only, to the proper place, it is allowed to escape from under the skin by a wound made with the scissors after the same manner. The material which I have found best adapted for a seton in such cases is a piece of strong broad tape-wick; strong digestive ointment to be put on the middle of a suitable length of the tape; and, after drawing it over the joint under the skin with the needle, the two ends of the setoning string are fastened together, and all is right. The seton must be shifted daily, and, at the same time, smeared with fresh ointment, and to be retained and kept in operation as long as its presence is considered beneficial. If the diseased joint has suppurated, then the matter or pus must be allowed to escape by free incisions, and blistering resorted to.

I shall now proceed to give a few illustrative cases, the treatment adopted, and the results.

*Case I.*—Of a sheep, is recorded at page 227. *Tuberculous.*

*Case II.*—I made a post-mortem examination of the carcass of a cow that had had disease of the stifle-joint; had been actively treated, both constitutionally and locally. By the treatment the joint was reduced in size; the active disease was removed; and it was known to be becoming ankylosed, when, almost at once, she exhibited unmistakeable symptoms of consumption; took very little food; responded to no medicine; fell rapidly off in condition; eyes sunk;



neck long and narrow; spine arched like a razor-back fish; the skin apparently glued to the ribs, and to every part of the almost skeleton body. The owner had her destroyed. The lungs and almost all the viscera were studded over with tubercles in every stage of development. On laying open the diseased joint, there were large formations of new bony matter passing between the *tibia* and *femur*, the elevations of the one side corresponding to the depressions of the other; there was no cartilage to be distinguished; the patella was adherent to the mass; in some of the cavities there was pus, very thick pus; and in some places of the joint the matter was of a cheesy consistency, evidently strumous, but having no deposit of bone earth, at least none consolidated: other cavities were filled with something resembling coagulated blood; no smell whatever. Grinding the teeth was one of the living symptoms of this animal, and I have invariably found that where there exists this grinding of the teeth, the digestive system is acid; and, moreover, where this acid state of the system exists and prevails, even for a moderately lengthened period, there is uniformly a constitutional tendency to deposit bone-earth, often in the form of lime-salts. I have taken this lime-salts from tubercles formed on the mesentery, in the lungs, and about the kidneys, and have had them—the salts from tubercles—examined under the microscope, with powers varying from 200 to 700 diameters; have had them tested chemically, and am certain of their nature and composition. I am also convinced from observations made during many years, and on a number of cases, that the peculiar state of the skin in animals which we call *hide-bound*, and which in all cases accompanies this affection, does not depend on the skin being essentially faster to the ribs than natural, but arises from the fact that there exists an acid state of the digestive system, and under that state there is a deposit of lime-salts, bone-earth, &c., in many organs of the body, and, amongst others, in the substance of the skin. These deposits destroy its softness and pliancy, and by their presence render its texture dense, firm, and non-elastic, and more difficult to be raised by the hand than a healthy skin—this constitutes *hide-bound*.

I believe the state of the constitution now described was favourable to the production of ankylosis in the diseased joint of this cow, but the tubercular diathesis prevailing to such a fearful extent made the general health give way, and the animal had to be destroyed.

To counteract this acid state of the digestive system so common in cattle, and so productive of organic mischief in the animal system, I give alkalies and vegetable bitters, with mineral tonics, commonly some preparation of iron, often the powders Nos. V. and VI. alternately, in five gills of linseed gruel, or some modification of these according to the size of the beast and the urgency of the case.

*Case III.*—A cow of the pure shorthorn breed, purchased at seventy guineas from the stock of a Mr Crofton, a breeder near



Durham, was one day observed very lame on the left hind leg. Very soon I was requested to attend her; found the stifle-joint enlarged, hot, tense, and very tender; bled from the neck to 5 quarts; gave a dose of purgative medicine; had the animal kept quiet and at perfect rest. At frequent intervals kept bathing the tumified joint with a cooling lotion composed of—

No. IV.	{	R Acetic acid,	.	.	.	.	1 gill.
		Spirits of wine,	.	.	.	.	2 gills.
		Water,	.	.	.	.	2 gills.
							Mix.

After continuing this local treatment for upwards of two weeks, and finding little or no improvement in the ability to walk, but the joint much cooler and less tumified, I commenced treating it with ointment composed of—

No. III.	{	R Iodine, . . . . .	3 ij.
		Iodide potassium, . . . . .	3 j.ss.
		Lard, . . . . .	3 ij.ss.
Mix.			

This ointment was, with a good deal of smart friction, frequently applied to the surface of the diseased joint, also for a small way around it. At the same time I had the bowels kept under the action of laxative medicine, and exhibited by the mouth—

No. II.	{	R Iodide potassium, . . . . .	Grs. xl.
		Iodine, . . . . .	Grs. x.
		Ginger, pulverised, . . . . .	3j.
			Mix—one dose.

This dose given in thin gruel, made by boiling linseed in water—one Scotch pint of this gruel to each dose; one dose given in the morning and another in the forenoon, and continuing this daily for one week; then stopping the treatment for one week, and so on, resuming the same treatment every alternate week for some three months. The joint was ever after stiff, but very much improved indeed. I may here mention that I believe much of the iodine exhibited by the mouth is, in such cases, eliminated by the kidneys, as, during its exhibition to this cow, the urine showed the characteristic blue colour on being tested by a thin solution of starch containing a small quantity of free chlorine. The ultimate history of this animal is that she became affected with tuberculous consumption, and had to be destroyed.

*Case IV.*—I recently had the privilege of making a post-mortem examination of a young animal that had idiopathic synovitis of three principal joints, all on the right side; it could not walk but with great pain and difficulty, and, being apparently a hopeless case, the owner had it destroyed. Before I saw it first, the capsular ligament



of the diseased joint was enormously distended; the ends of the bones enlarged, and all round the joints very tender, the animal evincing great pain on the slightest pressure. On laying open the diseased joints, I found the synovial membrane a good deal injected; the fluid contained in the joints was not so glairy as natural, was much thinner, and mixed up with innumerable shreds of very tough coagulable lymph; much of this partially organised lymph was adherent to the synovial membrane, and at one particular spot a good deal of it adhered to the articular surface. Although the disease was said to have existed for three or four months, in no part was the cartilaginous surface abraded. The stifle-joint was one of those affected, and both the semilunar cartilages were entire. In none of the viscera of this beast could disease be detected; and, as it sucked its mother, I believe very little was known about the state of its digestive system. There was no treatment in this case.

*Case V.*—I was called to a beast with the hock-joint in a fearful state; enlargement and suppuration; at three points, one outside, one inside, and one almost in front, it was apparently ready to burst; the animal could not put the limb to the ground at all. I opened all these places freely, and an immense quantity of purulent stuff escaped; the animal was then relieved of the pain, but could not use the limb at all. I had the joint frequently dressed with lotion No. VIII. (page 240) for two weeks, and then blistered the joint all round with a blister. It rapidly improved, and in the following winter I fired and blistered the joint again; and, excepting that the joint is a good deal enlarged, the limb is as useful as its fellow that was never diseased. This case existed some weeks before I was called to attend it, and was clearly synovitis.

*Case VI.*—I attended an ox of one year old with a diseased pastern-joint: the joint had been affected, and under treatment also for some weeks before it came under my care. I found the disease in a fore extremity; the joint was very much swollen all round, and very tender on pressure, but not very hot. I had it blistered with a blister very extensively and severely; and, as the animal could make little or no use of it, he was kept very quiet. I had the pastern fired with a hot iron in the usual manner, &c., and blistered again. In about six months he was quite well, that is, free from active disease, but the joint remained large and stiff: the long disease kept him much behind; when the other cattle, same quality and age, were sold at L.18 a-head, this one brought only L.11.

It was not known to any one whether this ox got any hurt or not, the case appeared to me, however, as being the result of a sprain, but may have been *synovitis*. In cattle it is very difficult sometimes, *nay often*, to find out if there has been any injury sustained or not. Cattle are so much alone, you find one lame, and if there is no laceration, puncture, or contusion apparent, then you say it is *natural*—



whereas it may be a sprain or bruise with no externally apparent symptom.

*Case VII.*—I was called to visit a lame beast; I found him with a great enlargement immediately between the stifle-joint and the hock-joint, inside the leg, but more closely attached to the former joint. It was very tender, hot, and a little, but very dull, fluctuation could be felt. I had it repeatedly bathed with warm water, and in three days the abscess was ripe for opening; afraid of its having a communication with the cavity of the stifle-joint, I opened it at the very lowest possible point, which was close to the hock-joint; a great quantity of pus escaped. Next day the synovia of the stifle-joint was perceptible in the discharge, the cavity of the abscess having communication with the stifle-joint; two days after, the synovia came freely and almost pure. I pinned up the wound, putting a large quantity of *tow* on the pin. The synovia collected in the large cavity formed by the abscess, and ultimately burst out afresh; I passed a long needle through the lips of the wound, put on a large quantity of *tow*, and blistered the whole part that had been occupied underneath by the abscess, and also for a considerable way around, with a blister; I did so, expecting that *adhesion* would be produced, and so confine the synovia to the cavity of the joint. The synovia collected still, however; the stifle-joint was a little affected at this stage, *synovitis* supervened, and I blistered again with no better result. After the blistered surface was whole, I made a *pad* suited to the breadth of the place, and in length to reach from the wound to the stifle-joint; I took a soft and a long bandage, and put round all the limb between the hock and stifle, firmly keeping the *pad* on the cavity—the track pursued by the synovia in its progress from the stifle-joint to the wound. This had the desired effect; the synovia was completely confined to the joint; complete adhesion took place of the entire base of the abscess with the detached skin, &c.; the synovia never again appearing. The joint is a good deal enlarged, and stiffish, but the animal has the complete use of the limb. In this case I gave no constitutional treatment, as the animal was sucking his mother, and always in good health.

*Case VIII.*—On the 8th March, 1861, I was called to visit a two-year-old ox—a feeder; his left fore leg was much swollen about the knee, hot, and very tender, especially immediately at the joint. I took a fair bleeding from the neck, gave him salts and oil as opening medicine, applied the cooling lotion, as in case No IV., very frequently to the affected part, and in five days he was very much improved—tenderness gone, heat and inflammation subsided. In the course of a few days I was called to him again; he was said to have *foul* of the hind foot—same side—so bad that he could put no weight upon it. I soon found that there was nothing wrong with the foot, and discovered the cause of the lameness to be disease of the stifle-joint, which was tender, hot, enlarged, and stiff. I advised that the



animal should be slaughtered, as he was in good condition for the butcher, and would very likely daily sink in weight. The butcher found matter, *pus*, in the affected joints, also in some other joints; and, what astonished him more, the fundus of the urinary bladder, in place of being rounded, as is commonly the case, terminated in a blunt point of half an inch, and that extended into a tapering tube until he lost sight of it amongst the neighbouring tissues; this bladder he preserved as a curiosity. It is needless to say that the tube now referred to was the *urachus*; but as some of my readers may not be professional, I will take the liberty to explain what the *urachus* is. In the lower animals, while in the *fœtal* state, the *urachus* is a ligamentary hollow tube that arises from the base of the urinary bladder, and in which the cavity of the bladder terminates; this tube conveys the urine from the foetus to the allantoïd membrane—an organ situated between the chorion and amnion, and receiving the foetal urine up to the period of birth, when it (the *urachus*) generally disappears. In some cases I have known it remain for a considerable time after birth, the young animal for some time discharging the urine at the umbilicus, but this gradually disappearing as the animal got older, generally a few weeks after birth.

Here the butcher's discovery was certainly a very uncommon one, to find the *urachus* entire and *pervous* in an animal considerably more than two years old! I am not aware of there being any such thing on record; if there is, I have never met with it either in practice or any writing. The fact also that the animal was diseased in the joints, *pus* being deposited in several of them, makes it very probable that there was *pus* in this *urachus*; the butcher had never met with such a case, and he did not examine it very minutely, merely keeping it as a curiosity; he knew it was not common, but was not aware that it was so uncommon.

A clever veterinary surgeon,<sup>1</sup> and one who has had a good practice, stated to me that he had never examined the carcass of a young animal, *including foals*, that died or was killed for joint disease but had the *urachus* entire, and that in these cases of joint disease the *urachus* always contained a small quantity of *pus*.

I examined the carcass of a foal that was shot for joint disease; it was about four months old, and certainly the *urachus* was apparently entire, but contained no *pus*. The subject is well worth investigation. What might assist in the obliteration of the *urachus* would be passing a ligature round the umbilical cord pretty close to the young animal, immediately after its birth, &c.

That the *pus* existing in the *urachus* might be taken up and deposited in joints in various parts of the body, is very likely to take place; of this, the absorption of *pus* and its deposition in *other parts* of the body, many instances might be adduced.

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<sup>1</sup> Mr G. Stewart, V.S., Rothiemay.



*Case IX.*—A farm overseer in my neighbourhood purchased eight two-year-olds from the west country; these cattle he thought not very healthy-looking, and he took some blood from the neck of each to make them thrive better; without fastening the wounds, he turned them when bled into the park. The days were rather cold and wet; the wounds on the neck of two of the cattle did not heal kindly, they gaped out, had inverted edges, &c.; very soon the whole side of the necks of the two became swollen and very painful; they could not eat. I was then called to visit them, and found their necks very much tumified and hard, with an ichorous discharge from the wounds, &c. One of the beasts being in fair condition, I desired its being slaughtered, as only the neck would be lost. The other beast was thin and not worth killing. Everything was done to save this animal that could be thought of; but after hanging about for six weeks, it was thought advisable to have it destroyed, as it had been perfectly unable to stand or walk for some time, the joints generally being hot, tumified, and extremely painful. A post-mortem examination showed every cavity about the various joints filled with pus; all the internal organs were in a perfectly healthy state.

I am of opinion that the diseased joints here were due to the absorption of pus from the inflamed and suppurating neck; and this absorbed pus being deposited in the joints, set up irritation, and the low hectic fever this constitutional irritation produced rendered the animal a hopeless subject.

*Case X.*—I attended a beast that had got a kick on the hock-joint, which was laid open. One week had elapsed after the injury before I saw it. The lameness was extreme; at every movement made by the animal, synovia in an unhealthy state flowed freely from a small opening that communicated with the interior of the joint. To sweeten the discharge, and correct the diseased state of the membrane inside, with a small syringe I repeatedly injected into the cavity of the joint “Beaufoy’s chloride of soda,” diluted with four parts of water; after this I closed the wound by applying to it the bichloride of mercury, using a light bandage for a short time, and then blistering over the whole joints again and again with a blister. After the lapse of about two months it had the use of the leg; the joint was, however, somewhat stiffish and enlarged ever after.

*Case XI.*—Visited a grown beast that had got a kick from a horse on the shoulder: the olecranon was fractured or loosened, but not displaced; great tumifaction, with heat and tenderness of the injured parts, and inflammation about the joint. The animal could make no use of the limb, *none*. I took a good bleeding from the neck, gave a dose of opening medicine, and applied the cold lotion as in case No. IV. for ten days, when the animal made some use of the limb. I put on the following blister:—



No. I.	{	R	Canthar. pulver.,	.	.	.	3 iij.ss.
			Venice turpentine,	.	.	.	3 iij.ss.
			Lard,	.	.	.	3 ij.
							Mix.

This was well rubbed in over the joint, with but little improvement. Repeated the blister, and still a good deal of lameness: applied an ointment of the bin-iodide of mercury, with a good deal of friction, composed of—

No. VII.	{	R	Bin-Iodide,	.	.	.	3 j.
			Wax,	.	.	.	3 j.
			Lard,	.	.	.	3 vij.
							Mix.

This had the desired effect. After a few weeks the animal was quite sound, but a little thickening remained about the injured part.

*Case XII.*—I was called to an old calf, a strong beast, lame on one leg: the stifle joint enlarged, hot, and tender. Was pretty well in general health, but lean; applied the cold lotion of case No. IV. for one week, but no improvement; blistered over the joint with No. I. blister, Case XI., but no better; passed a seton, 9 inches long, over the joint on the outside, keeping it in operation with savine ointment; when, after some few months, it had the partial use of the limb; the joint thicker and stiffer than natural, but quite hearty to run after its fashion, and quite able to shift for its meat. This beast was too long without treatment; the first stage of the attack, *rheumatic*, was passed before I saw it.

*Case XIII.*—A cross cow, a strong young animal, six weeks after calving, was observed very stiff when out to the water, sometimes one and sometimes another limb would be stiffer than the others. Considerable constitutional irritation being present, blood was taken to the extent of four quarts or thereby, and some laxatives given, but the animal was no better. Particular parts of the animal, those apparently most affected, were rubbed with a stimulating embrocation—spirits turpentine, with one fourth part olive oil added—and still no improvement. The appetite failed, grinding of the teeth, &c., and the yield of milk became less; gave for one week the powders described in Case No. V., one every night in gruel, and still no improvement. The animal now lost the power of walking, and scarcely rose up at all; the joints became tender, hot, and enlarged; and, as she was in good condition, the owner sold her to a butcher. When slaughtered there was scarcely a joint (if any) in which there was not more or less of pus. I did not examine the membranes, as she was slaughtered some days before I was aware. This was clearly a case of rheumatism, terminating in inflamed joints, with a deposit of pus in them.



The following are some of the powders and lotions referred to in the foregoing section.

*Stimulating Stomachic Powders.*

No. V.	{	R Carb. am. pulv.,	.	.	3 iij.
		Nitre pulv.,	.	.	3 jv.
		Ginger pulv.,	.	.	3 iij.
		Gentian pulv.,	.	.	3 jv.
		Aqua am., sp. gty. 880, fl.,	.	.	3 ij.
Mix; one dose.					

*Tonic Powders.*

No. VI.	{	R Ferri sulph. pulv.,	.	.	3 iij.
		Gentian pulv.,	.	.	3 jv.
		Ginger pulv.,	.	.	3 ij.
		Carb. am.,	.	.	3 j.ss.
Mix; one dose.					

*The White Lotion.*

No. VIII.	{	R	Zinci sulph.,	.	.	.	3 vj.
			Plumbi acet.,	.	.	.	3 j.
			Spring water,	.	.	.	3 xx.
							Mix.

PREVENTION OF JOINT-ILL.

One of the first rules that a stockmaster should adopt is to make a good selection of animals, whether sheep or cattle; this may be depended on—that there are healthy and unhealthy flocks of sheep to select from, and there are healthy and unhealthy herds of cattle from which to select animals for breeding purposes; the best formed and best conditioned animals to look at may not be the most eligible to breed from—may not produce the most healthy stock.

Medical gentlemen tell us that they know strumous persons, even when in perfect health, by merely looking at them. I am not sufficiently versed in these matters to say how far this is or is not true; but I am not aware that any such power of diagnosis and prognosis is possessed by any stockmaster, experienced cattle-breeder, or veterinary surgeon; at any rate, I find such persons are as often deceived in the animals they purchase at sales, as are others of far less note as judges of cattle, sheep, &c.

There is one reliable source of information open to all purchasers of breeding-stock—acquire a knowledge of the antecedents of the stock from which he purposes to purchase: what per centage of such stock have died from, or been slaughtered for, disease within a given number of years back? With what diseases have they been affected? Have rheumatic or tubercular diseases appeared in the stock? and to what extent have they prevailed? Examine the premises on which they have been raised, and find out from observation and inquiry how they have been treated when young.



It is many years since an Englishman, in writing on the breeding of cattle, said, "All good stock must be bred with attention and well fed; it is necessary that these two essentials in this species of improvement should always accompany each other, for without resources of keeping it is vain to attempt raising a capital stock." Every purchaser of good cattle should value his own resources, for it is in the highest degree absurd to purchase high-bred, well-housed, well-fed cattle, and put them on a farm of poor soil, meagre keep, and filthy, ill-ventilated, or ill-drained tenements. It is also true that many bulls that are sold at high figures and from good stock, have been pushed by keep, &c., to the highest degree of fattening and growth—circumstances often becoming a source of weakness.

To physiologists it is a well-known fact that warm-blooded animals require, for the due support of life and proper development of the body, substances which are divided into two classes: the *nitrogenised* and the *non-nitrogenised*; the *former* of these the animal system converts into blood, the *latter* cannot be made to undergo this transformation; from the blood are formed all the organised tissues, *i.e.*, from the nitrogenised portion of the aliment. The other class of substances, non-nitrogenised, supports the process of respiration. The *first* are called the plastic elements of nutrition, the *second* the elements of respiration. Liebig's and others' chemical researches have shown that all the portions of vegetables that can afford nourishment to animals contain constituents which are rich in nitrogen; and ordinary experience shows us that animals require less of those plants for the due support and nutrition of their bodies, just in proportion as they abound in these nitrogenised elements; and it is well known that these important products are especially abundant in the seeds of our different kinds of grain, and of pease, beans, and lentils, and in the roots and juices of many of our agricultural vegetables.

Liebig, after referring to the nutritive powers of nitrogenised constituents, thus writes: "While the preceding considerations leave no doubt as to the way in which the growth, the increase of mass in an animal is carried on, there remains the question—What is the function performed in the animal system by substances containing no nitrogen, such as sugar, starch, gum, pectine, &c.?" In order to enable us to answer this question truthfully and intelligently, we must glance at the element oxygen in some of its important relations to *life*. The observations of vegetable physiologists and the researches of chemists have mutually contributed to establish the fact, that the growth and development of vegetables depends on the *elimination* of oxygen. In contradistinction to vegetable life, the life of animals exhibits itself in the continual *absorption* of the oxygen of the air, and its combination with certain component parts of the animal body or food. Oxygen is principally absorbed into the animal body by the lungs and skin; in the animal system it unites with the carbon contained in the food furnished to the animal; carbonic acid is the result;



and the union is distinguished also by the production of *heat*—the principal source of animal heat.

But, when animals are tied closely up, debarred from exercise, and the houses in which they are so kept are warm, and the animals are fed on substances containing sugar, starch, gum, pectine (these are rich in carbon), then, under these circumstances, there is a very small quantity of oxygen absorbed and much *carbon* supplied by the food. There is comparatively little of this carbon required for the production of heat in conducting the respiratory process, and all the remainder is employed in the production of a substance which, in the normal state, only occurs in small quantity as a constituent of the nerves and brain—this substance is *fat*.

The flesh of wild animals is, almost always, devoid of fat, while that of stall-fed animals is covered with it. When the fattened animal is allowed to move freely in the open air, or compelled to draw heavy burdens, the fat again disappears; it is thus plain, that the formation of fat in the animal system is the result of a want of a due proportion between the food taken into the stomach and the oxygen absorbed by the lungs and skin. A pig, when fed with highly-nitrogenised food, becomes full of flesh; when fed with non-nitrogenised food it acquires little flesh but a thick layer of fat. Fat is thus an abnormal deposit—certainly not compatible with the highest development of the animal system, and does not indicate a truly healthy and vigorous state of the animal body.<sup>1</sup>

What I now urge upon the notice of those raising cattle is this: bulls and heifers, when young, if intended for breeding purposes, should not be kept and treated after the manner of cattle fattening for the butcher, as is too commonly the case, but the *very reverse*; food rich in nitrogen should be liberally supplied to them, the buildings they occupy should be perfectly ventilated; they should have ample scope for exercise, with no possibility of the air they breathe being contaminated;—these are the circumstances—the proper conditions—which will in general insure a stock of hardy, healthy, and prolific beasts. They may not be so very nice to look at as the extremely *fat* beasts are, but they will be found better and far surer property. Young bulls raised on the fattening principle are jolly beasts to look at, but, being very tender and delicate, are not in any way fit at their age to serve the large cows to which they are often turned out, consequently they injure themselves, are soon affected with joint-ill, or are otherwise perfectly useless for breeding purposes. Bulls of the shorthorn breed are, in general, put far too soon to serve cows; such a practice of making use of animals for breeding purposes prematurely, and before they have arrived at some degree of maturity, tends not only to reduce the breed in size, but destroys the *stamina* of that particular family, and renders them

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<sup>1</sup> The reader should consult *Professor Johnston's Agricultural Lectures*, and *Mulder and Liebig on Vegetable and Animal Physiology*, &c.



much more subject to scrofulous and rheumatic affections, with all their concomitant or resultant evils, such as tuberculosis, joint-ill, &c.

I would recommend that in the calf-byre each young calf should be allotted a space 6 feet square, not tied at all, and allowed to jump about at will. The divisions forming the calf-boxes should consist of narrow splits of wood, upright, with 3-inch openings between every two, are 4 feet high, and afford full scope to the circulation of pure air. I have had experience that the stock raised in these houses is admirably healthy.

Every grass field on which cattle are put to graze night and day should be accommodated with a perfect shelter from cold winds, rains, or excessive heats; this may easily be effected by raising temporary houses of wood; the stock occupying every enclosure should have free access to such houses. A house 30 feet long and 10 feet wide *inside*, would shelter some twenty cattle of two years old. These erections, being placed at the crossings of divisions or fences would, by a little contrivance, be available to more enclosures than one; and, where fairly tried, will be found of immense benefit to cattle during the extremes of cold and heat. It is not the amount of heat or cold in this temperate climate that does the injury to animals, &c., it is the transition from heat to cold, and *vice versa*, that is to be dreaded; and it has been found by experience that the transition from severe cold to excessive heat is the source of far more and greater evils to the animal system than is the transition from heat to cold. It is almost needless to say that every enclosure should be furnished with a full supply of good water, available at all times to its occupants. Attention to these generalities will go a great way towards preventing joint-ill and other affections of analogous character.

#### CONCLUDING REMARKS ON JOINT-ILL.

I have thus very briefly gone over some of the causes, "remote" and "proximate," that induce joint-ill or joint-disease, both directly and indirectly; I have given a few cases simply as they occurred to and were treated by me in my everyday practice; I have made a selection, from among many, of those cases which I considered would best illustrate the different phases of joint-ill; these illustrations include the treatment adopted by me, and its results. Affections induced by external injury are given, because I conceive the disease of the joint that followed the injury was as much owing to constitutional irritability, a tendency to strumous affections in the animal, &c., as to the direct effects of the injury; in other words, had the animals been in a perfectly sound and healthy condition, the injuries received might have passed off, in most cases, with little or no trouble. And I may say that, in all analogous cases that have occurred in my practice, I have adopted the same treatment as that now explained—of course modified by and adapted to the nature of the case, the size and age of the animal, &c.

I have given thirteen cases in illustration—three tubercular, four idiopathic synovitis, two of pus deposited in joints from other sources within the body, two the result of external accidents, and two cases following rheumatism. I have also pointed out some things that I conceive would, if adopted, tend to prevent the appearance of this most intractable malady.

In conclusion, I would say, if every veterinary surgeon would faithfully record and make public his own experience, and HIS OWN EXPERIENCE ONLY, then we might soon be in possession of reliable, extended, and useful statistics relating to health and disease in the lower animals.

I have already said that, in consequence of the onward march of intellectual enlightenment, the mass of general readers are better prepared for appreciating and profiting by the perusal of any professional disquisition than they were a few years back; they are also far better judges of the true value of the services of scientific men, whether that service be spent on the human or the brute. And whether we have the talent or the perseverance to investigate, detect, and demonstrate them or not, there cannot be a doubt but the animal system, *in health* and *under disease*, is regulated by laws as precise in their nature, as specific in their character and action, and as *demonstrable* even in their *profundity*, as are the laws that determine the motions of the beautiful orbs that sweep in silent majesty over our heads, or the no less wondrous ocean that rolls in grandeur “around our much-loved isle.”



# EDINBURGH VETERINARY REVIEW

AND

## *Annals of Comparative Pathology.*

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### PROPOSED INTERNATIONAL CONGRESS OF VETERINARY SURGEONS,

TO BE HELD IN HAMBURGH FROM THE 14TH TO THE 20TH JULY, 1863.

IT is a fact well worthy of notice, that with progress in the commercial relations established between different countries, with greater facilities for the transit and sale of stock so as to meet the demands of Western Europe, there has been, during the last twenty years, an increased prevalence of contagious disorders.

The want of accurate statistics relating to the losses sustained by plagues communicated from country to country, in the lines of communication established by trade, is severely felt. It is owing to this want that no measures have been suggested to, or, at all events, adopted by the several Governments of Europe, for their individual and mutual benefit; and that Europe is now suffering, to a very considerable extent, from the system by which one people attempts to save itself from loss, by disposing of diseased and infected stock to another.

It is with a view to give an impetus to the rearing of stock—it is as a means of direct encouragement to agricultural enterprise, that it is proposed to hold an International Congress of the Professors of Veterinary Science at Hamburgh, and of members of the Veterinary Profession generally, during the period that agriculturists are invited to derive all the advantages of an International Agricultural Exhibition.

It is hoped that the representatives from different parts of Europe will meet together with an earnest desire to demonstrate the importance of Veterinary Science, and with a view to suggest an uniform system throughout Europe for the prevention of plagues, that are a source, at all times, of pecuniary loss, and not unfrequently of disease to man.

In order to fulfil these objects, it is proposed that the representatives

from different countries should communicate in the form of Essays as much information as possible on the following points:—

*Firstly*, On the extent to which contagious diseases prevail in their respective countries.

*Secondly*, On the imports and exports of live stock, and on the direction in which the plagues chiefly spread in each country.

*Thirdly*, On the means recognised by the author of the essay as most effectual to prevent the diseases.

Original papers on any Veterinary Subjects may be read during the International Congress.

It is, moreover, proposed that, with the aid of the information thus obtained, a statement of facts should be prepared, and resolutions drawn up, to be submitted to the different Governments of Europe, with a view to the institution of an uniform system for the protection of stock from plagues, which owe their origin, as a rule, to the climates and soils of the East.

It will then remain for the People or the Governments of different countries to adopt or reject the propositions of those best qualified to advise on the important social questions to be discussed at the International Congress. If the advice be acted on, the object of the Congress will be achieved; and if not, there can be no doubt that an interchange of opinion and a collection of facts cannot fail to interest as well as benefit the Veterinary Profession in all parts of Europe.

All Gentlemen who intend to take part in the International Congress, are desired to communicate with Professor JOHN GAMGEE, Principal of the New Veterinary College, Edinburgh.

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## DISEASE AMONGST CATTLE AND SHEEP ABROAD.

CONTAGIOUS typhus has been spreading. It has passed from Russia into Poland, Hungary, Austria, Turkey, and through Illyria and Ancona it has reached the gates of Rome. Knowing, as we do, to what extent the movements of Russian armies and revolutions in Central Europe have led to the spread of plagues in animals, we cannot but regard the aspect of affairs in any other but a very threatening light, though it must not be forgotten that it will only be when Austria and Prussia are involved in war that we shall stand in imminent



danger of the communication of the Rinderpest across the German Ocean. We are indeed suffering through the lung disease and epizootic aphtha, and never suffered more than in 1862, though in the first months of the past year the progress of contagious disorders over the European Continent did not seem to be favoured by circumstances so much as at present. The president of the Presburg Agricultural Association informs us by letter, bearing date the 2d of March, that official reports indicate a constant extension of the malady. A committee of scientific men from various Austrian provinces has been appointed to watch the progress of, and check the ravages by the plague. They are to carry out a system of wholesale inoculation, which, we must confess, is sufficient in itself to excite a little terror, when we know how the practice of inoculation perpetuates contagious disorders in various parts of Europe. They are, however, to enforce quarantine and other measures calculated to limit the outbreaks of so frightful a scourge. The learned president, Dr Czibbert, also informs us that the rumours concerning the communication of the disease from cattle to sheep are entirely without foundation, so far as his observations and the consultation of reliable reports are concerned. The disease is well known to be restricted to the ox species, and we have no doubt that the rumours hitherto afloat have chiefly arisen from the mortality, in different parts on the Continent, arising from small-pox.

Up to latest advices, fresh outbreaks of small-pox have occurred in Mecklenburg, whence we derived the disease last year, and may obtain diseased sheep from thence again.

Professor Gerlach, Director of the Veterinary College in Hanover, reports by letter, bearing date the 20th March, that the flocks in the northern division of the Kingdom of Hanover have been suffering severely from the small-pox up to the present time. The malady has not yet reappeared in South Hanover.

A matter of great interest to us is the prevalence of pleuro-pneumonia in Schleswig-Holstein. This was the subject of a debate in the Chamber of Deputies at Itzehoe on the 14th of March.

The deputies are determined to adopt the most vigorous measures to stop the disease, by prohibiting the importation of stock, and destroying herds in which the disease has appeared. Schleswig-Holstein depends a great deal on countries to its west for cattle and sheep to supply the English markets, and hence the repeated invasions of the foot-and-mouth disease and pleuro-pneumonia. If the Chamber

of Deputies determines to enforce regulations such as they propose to establish, it may interfere considerably with the arrival of stock at British ports from Denmark.

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## REPORTS ON THE HEALTH OF STOCK.

IN our next number it is our intention to publish the results of an inquiry into the health of stock in the United Kingdom during the year 1862. Reports have poured in with greater alacrity, and containing a larger body of information, than on the occasion of our first attempt last year. We have to thank the many professional friends who have so readily responded to our call, and trust they will individually feel gratified at having contributed to the collection of more reliable and complete information concerning the diseases of stock in this country than has hitherto been published. Within a few days after our circulars were issued this year, we received three times the total number of replies that were obtained altogether in 1862, and we still hope to hear from many who have not yet favoured us with returns. We know of no means more likely to demonstrate the value of the veterinary art to this country than the publication of facts to prove how much it suffers from disease amongst animals.

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## RAREY'S ART OF TAMING HORSES.

SINCE the publication of our article at page 95 of the present volume of the *Review*, we have received a letter from a very successful breeder of horses, whose experience as to Mr Rarey's system speaks for itself. The gentleman referred to says, "I can most fully confirm your article on the effects of Rarey's system. I was as much taken with it as any one, and sent the breaker to see it, and recommended him to adopt it. The consequence has been numerous cases of curb, spavin, and enlarged fetlocks, whilst, I believe I may say that in the preceding twenty years, I never had a horse with a curb, very rarely spavin, or any other unsoundness, although many of them were bred from the same sires and dams."



## VETERINARY JURISPRUDENCE.

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## BREACH OF WARRANTY.

BODMIN COUNTY COURT. Jan. 27. Before C. DACRES BEVAN, Esq., *Judge*.

THOMAS *v.* THOMAS.—Mr Commins for plaintiff—Plaintiff purchased a cow of defendant, a cattle dealer, who gave him a written warranty with it. On arriving home he found that the cow had a swelling in the throat, and was otherwise unsound. Defendant would not pay plaintiff back the money, but offered to give him a horse in exchange. To this the plaintiff would not agree. After a time the cow died, and 6s. was made of the skin. This action was brought to recover the balance.

John Thomas said: I am a farmer. I purchased the heifer in question of defendant. I had a warranty with it. Three or four days after I got home, I found that it had a swelling under the cheek. Sometimes it swelled very much. When the weather was dry it went back, so that scarcely anything could be perceived. When I purchased it the weather was dry—then nothing was visible. I went to defendant on the 24th of November, told him the heifer was unsound, and demanded my money. He said he did not know much about the animal; he bought her of a man at Barnstaple. When I bought her he told me he had reared her. I did not want the horse. On the 6th of December I ordered the heifer to be brought to Bodmin fair. I afterwards found that she died on the road. The cause of death was the complaint I have described.

Cross-examined by defendant: It was three weeks and two days before I went to see you. I did not know where to find you.

Walter Cock said: I drew up the warranty, and witness signed it. That is my signature. I saw the heifer the same day. I said I should not like to have anything to do with her; she was very thin, and the skin was dry. I did not pay very much attention to her.

John Thomas, senior, said: I am plaintiff's father. I was present when the heifer was purchased. I drove the heifer to Bodmin fair. I was present when she fell down in the road. That was the last time I saw her alive. I went to fetch Mr Cawrse. I am used to cattle. There were all the symptoms of the heifer being very ill, and about to die.

William Cawrse said: I am a farrier, residing at Bodmin. I was sent for to see the heifer at Laveddon. I found her labouring under liver complaint. She seemed near death. Judging from appearances, I should imagine she had been diseased from three to four months. Any one who knew anything about cattle must have known she was diseased. I said she must be removed from the turnpike road and killed. When I saw her again she was skinned. I found in the liver flukes. That shows unsoundness. I consider the heifer to have been unsound for three months at least.

Judgment for plaintiff, with costs.

JONES *v.* HAMMER.—Mr Commins for plaintiff, Mr Meredith for defendant.—This was a claim of L.17, 18s. 6d. for money paid and damage sustained on the sale and exchange of a mare by plaintiff, for a horse defendant warranted to be sound, but which proved unsound; and also the expense of a journey to defendant's residence, and the fee of the veterinary surgeon who examined the horse. Mr Commins stated the case and called

Henry Jones, who said: I live at Northill, I went to St Lawrence fair and saw the horse in question. I saw the defendant's man, who said his master wanted to make an exchange for one that could be ridden or driven. Defendant came, and asked if I wanted to buy a horse? I did not want to buy a horse exactly, but I would exchange one with him. I said it was up in the town, at the Gar-

land Ox. I asked why he was going to sell his horse? He said he had a larger one, and wanted to get one to ride or drive. He said his horse was perfectly sound. We walked together to Bodmin. His man rode my horse up and down, and then put it back into the stable. He said he thought I ought to give him L.2 to boot. I told him I did not think I ought to give him anything, taking the age into consideration. My horse was five years old. He told me he was eight years old and no more. We went into the house. I said, if your horse is sound, and all that you say, I'll give you a sovereign. Defendant said it should be a deal. He said his horse was sound, and his man said so too. I paid the defendant the L.1, as agreed. I put the horse into my trap. Previous to our dealing Mr Buckingham came up. The same evening I picked up Richard Lander, and we drove home together. During the journey I stopped at the Half-way House, and gave the horse some gruel. Before I arrived there I found the horse getting fagged. Lander noticed the same. Next day my son took the horse to Callington. We took six hours getting from Bodmin to my house. It ought to have taken only half that time. When my son came back from Callington, I went to Liskeard, and spoke to Mr Lamb, a veterinary surgeon there, about the horse. In consequence of what Mr Lamb said, I took the horse into a plantation. I showed the horse to him. The horse appeared very weak, and had a running at the nose. I never saw a horse with the glanders before. I went to defendant's residence. On the following day he came to Liskeard with Mr Thomas. Mr Thomas said, "There are no two opinions about this, the horse is diseased." Mr Lamb agreed with him that the horse must be slaughtered. Defendant said so too. He asked if it could be sold for dogs. I said I should have nothing to do with selling it. Mr Lamb said it was dangerous to human life. The horse was killed the same day. I proposed to Mr Hammer to be paid for the horse. He requested me to wait till the Tuesday, when he would consult his lawyer and write me. He gave me his address.

Cross-examined by Mr Meredith: The bargain was made at the Garland Ox. Mr Hammer, his man, and myself were present. I did not warrant my mare. I did not tell Mr Hammer my mare would pull a load. Hammer told me his horse was perfectly sound. I said my mare had a gall, and he had better be careful of it. The gall was about the size of half-a-crown. I suppose it was rather tender. Mr Hammer and his man both said they would soon put it to rights. My residence is about 21 miles from here. The horse was in good condition, and did not roll or tumble about. The running was principally from the near nostril.

Corroborative evidence was given by Mr Thomas Penaligan, a carrier; James Buckingham, an implement maker; Richard Landar, James Algar, and George William Lamb, the veterinary surgeon employed by the plaintiff, who proved the bad character of the disease.

Mr Meredith, for the defence, contended that no warrantry had been given, and that the defendant was not aware that the horse was glandered.

The witnesses for the defence were, Philip Henry Hammer, the defendant; Francis Dyer, defendant's waggoner; and George Page, a veterinary surgeon—the evidence of all of whom was in direct opposition to that of the other side.

Mr Commins ably replied on the whole case.

Judgment was given for plaintiff for £14, 18s. 6d. This case lasted for upwards of five hours.

#### DISEASED CATTLE.—EXTRAORDINARY ATTEMPT TO SET UP A NEW CATTLE MARKET AT WORCESTER.

ON Friday, Mr Berridge, the city inspector of the Worcester cattle market, prosecuted to a conviction a very serious case of exposing for sale in Worcester market cattle labouring under the contagious disease vulgarly called "the tick," and scientifically known as *Eczema Epizootica*. The magistrates were T. Chalk (chairman), J. W. Lea, T. Bucy, and E. Webb, Esqs. Mr A. Newman, farmer, of Hill



Croome, was summoned for having, on the 7th inst., brought two cows into the the Worcester cattle market, the said cows being infected with a certain disorder of a like nature—*i. e.*, alike contagious—with sheep-pox or *variola ovina*, and with well knowing them to be so infected. Mr W. Cawley, of Malvern, appeared for the defendant.

Mr Berridge deposed to finding in the market two cows belonging to the defendant, afflicted with the disease called “tick;” one of them was foaming at the mouth, and had a large sore on the tongue; the feet were sloughing, and the hind hoofs were cracking and bleeding. The disease was infectious, and was so pronounced by Mr Furnival, veterinary surgeon. Berridge said that he was interfered with by the defendant and others while examining the animals, and that both he and Mr Furnival were threatened.

Mr Furnival said, on examining one of the animals, he found two vesicles on the top of the tongue, two on the pad, and one large one in the centre of the tongue. All the fore feet were diseased, so much so as to render the animal unfit for travelling. There was a vesicle on one of the teats, and the milk was offensive and impure. The disease was similar to *variola ovina*, and animals treading in the litter on which diseased cattle had stood would be liable to catch the disease. The disease was called the *Eczema Epizootica*. In answer to Mr Cawley, witness said the disease was not very dangerous, if properly treated.

Mr Cawley said, if the cattle were diseased the defendant did not know of it, and that, as the disease generally came on suddenly, the defendant was not in a position to guard against it. He contended, moreover, that the disease was not of a similar nature to small-pox in sheep, and therefore not of the kind contemplated by the Act of Parliament. He called

Mr Corbett, former and cattle dealer, of Croome, who said he saw the defendant purchase a number of cattle in Bristol market, but he could not swear to the cows in question being a portion of them. The cattle were not diseased when at Bristol, to his belief.

Mr Corbett, veterinary surgeon, was called to look at the cattle, and found that they were just recovering from the disease. They were, however, still in an infectious state.

Mr R. Hill, farmer of Leigh, did not heed the disease, and bid for some of the herd after the superintendent had seen them. Purchased some of them. Had bought cattle suffering from the same disease, and often turned them up into his fields without taking any account of them—they had recovered.

Several other farmers gave evidence to the same effect.

The Bench held that the malady under which the cows were suffering was similar to the small-pox in sheep, in respect to being infectious, and that the defendant had a knowledge of it. They fined the defendant £5 and costs, altogether £6, 10s. 6d. The cattle were ordered to be given up.

On Saturday morning the following placard was issued:—“Notice.—The dealers of the county of Worcester will hold a sale of cattle and sheep in a field within 300 yards of the London turnpike, on Monday, March 16, 1863, at nine o’clock in the morning, and will be happy to meet all purchasers.—Worcester, March 14, 1863.”

It appears that several dealers took cattle to the place in question, and Mr Berridge states that he visited it, and pointed out several diseased animals among those exposed for sale to the parties present on the ground, which is in Battenhall Lane, close to the ground chosen for the Royal Agricultural Society’s exhibition. On the same Monday, at the sitting of the City Magistrates, at the Guildhall,

G. Curtler, Esq., said his attention had been drawn to the case heard on the previous Friday, and in which a conviction, to his mind a very proper one, had taken place; but he was surprised to see that several persons openly said that the disease was a matter of no importance. So far as his own personal knowledge and experience went, the disease was a matter of the greatest importance, and that he would not have it brought into his herd, he was going to say for at least 100 guineas, but that sum would not represent the damage he would suffer in a week or less. In the cattle fair that day he had seen a

great number of people, but none of them were of a contrary opinion to his own, and the matter was very freely discussed. He was happy to inform the Magistrates that the market was well stocked with healthy animals, and was well attended by respectable dealers and purchasers, and that there was but one opinion amongst them as to the decision which the Magistrates had come to, and he (Mr Curtler) would assure the Bench that, if another case of the sort occurred, he should be able to bring forward a number of gentlemen whose names would be a guarantee, and whose testimony would be quite sufficient, to show the dreadful effects of the disease. He would give them an instance of its effects. The other day he was at Dumbleton, near Evesham, where Mr Holland was about to have a sale of fat stock. The week before the sale, however, one of his cows became diseased, and in the course of the week the whole herd became affected with it, and the sale was obliged to be postponed, not only on account of the danger of selling the animals as human food, but also on account of the deterioration in their quality and value. From the state in which the animals were, the loss to Mr Holland would have been enormous. He had no hesitation in saying that cattle diseased, and in a state unfit for human food, had been sold by unscrupulous persons, and he had seen them brought into this city in that condition. He (Mr Curtler) had another object in view in bringing this matter before the Bench. He understood that a sort of new market had been started just outside the boundary of the city, as a means of preventing the question of diseased cattle coming before the authorities again, and also to afford parties an opportunity of purchasing such cattle if they chose to deal there. This new market was close by the spot where the great exhibition of cattle would be held in the summer; and therefore, if it was not put down, those parties who might now be inclined to send sound and valuable cattle to that exhibition would be deterred from doing so, and, if they looked to the great injury that would be done to the public at large, they would see that it was a very important question indeed.

After some conversation, during which the Bench thanked Mr Curtler for the information he had given, that gentleman said the nuisance would soon be got rid of if the public refused to deal with those butchers who bought off certain farms.—*Abridged from Worcester Herald.*

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## PERISCOPE.

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### CASE OF HYDROPHOBIA.

(From the Medical Times and Gazette.)

As our readers are aware, hydrophobia has been of late prevalent at Vienna. The following are some of the particulars of a case recently treated in the General Hospital:—On October 11, a boy, aged 6, was bitten in the left cheek by a mad dog. A surgeon, called at once, merely approximated the edges of the wound, which was partly healed when he was brought to the Hospital. It was then reopened and cauterised, and the child remained in the house without any bad symptom until the night of November 5 (twenty-five days after the bite), when the signs of hydrophobia began to manifest themselves, and rapidly became highly characteristic of the disease. Belladonna was given internally, while externally mercurial friction and subcutaneous injection of opium were resorted to. The boy died forty-eight hours after the outbreak of the disease, and three hours prior to his death erections existed. At the autopsy, the wounds were found cicatrised and covered with scabs. The dura mater was tense, and the sinus contained not only dark fluid blood, but also soft fibrinous coagula. The membranes and substance of the brain were considerably injected, and about a drachm of serum was found in the ventricles. The pons Varolii and the medulla oblongata were soft



and humid, but to this in so young a subject Professor Rokitansky attached little importance. A few fibrinous coagula were found in the sinus at the base of the skull. The mucous membrane of the mouth and throat was pale, as was that covering the tonsils, although these last were swollen, and discharged a discoloured purulent matter. The par vagum and sympathetic nerves were red and swollen, appearing also thicker on the right side. The sympathetic was remarkably softened. The left ventricle of the heart was contracted, and contained some soft fibrinous coagula, as did the left ventricle, which was in a relaxed condition. The stomach was contracted, and at its fundus a portion of the mucous membrane, the size of a thaler, had disappeared. The rest of the membrane was very pale, although there were also numerous ecchymoses, the size of pins' heads, scattered over it. The intestines were much distended and pale, the follicles being also enlarged. The kidneys were firm and the bladder contracted. The urine in this case was examined very carefully by Professor Haller. Its specific gravity was 1036, and contained a most surprising quantity of uric acid. The proportion of urea was also greatly augmented, but only mere traces of any abnormal bodies were discoverable. The chlorides were only moderately diminished, while the sulphates were increased to an extent seldom met with, except in sulphuric acid poisoning. The earthy phosphates were also greatly increased.—*Wien Spitals-Zeitung*, No. 46, 1862.

[Professor Sohuh, in a clinical lecture on this disease, states that our only reliance is in prophylactics, and that the best of these is the caustic potass. He adds, that seeing the great number of persons who are bitten by mad dogs in Vienna, and who neglect applying at the Hospital for treatment until the day after the accident, and the very few cases of hydrophobia that occur, it follows either that man is very little susceptible to the contagion of this disease, or that the caustic may be applied with tolerable certainty of success twenty-four hours after the occurrence of the accident.—*Ibid.*, No. 48.]

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## THE VETERINARY COLLEGE, PHILADELPHIA.

(From the North American and United States Gazette, March 5, 1863.)

THE Faculty and Graduates at the commencement of the Philadelphia Veterinary College met afterwards at the Wetherill House to partake of a collation, and indulge in social conversation. Though the subject was "Horseology" it was full of interest. The college is the first and only one in this country. Its commencement last week was the fifth since its creation. Its faculty are men of superior intelligence—Robert Jennings, Robert M'Clure, Charles M. Wood, and A. S. Copman—all of them regularly graduated in medicine, and acquired their education in veterinarianism by legitimate study. For this reason the Agricultural Society of Philadelphia recognised and encouraged the institution from its inception. Their patronage has been most valuable, while it was a deserved encouragement to merit free from pretence and ready to stand upon its own bottom.

The diseases of animals, as the science of veterinarianism is being developed, are closely allied to those in man. More than this, they yield to very much the same treatment. Sheep have small-pox, pigs have measles, and all the fevers incidental to humanity are reproduced in the equine and bovine species. The typhoid fever in the horse runs its nine days, and yields to febrifuges as it does in the human subject. The veterinary surgeon called to see a sick horse or colt, carries with him anodynes and sedatives selected from a materia medica nearly identical with that used by the physician. The acidulated drink given to the human subject in low forms of fever is given also to the horse, but in the shape of dilute sulphuric acid instead of lime juice, and in cases of inflammation podophyllin takes the place of calomel. Our veterinary surgeons, we learn, do well wherever their reputation is established. They have the advantage in one respect over physicians—they have no bad debts. The man who owns a horse

is always able to pay for his treatment, while the physician charges a considerable portion of his labour as a loan to the Lord.

Among other gentlemen who spoke, Professor M'Clure said that our government has 70,000 horses in its service, 20 per cent. of which die annually. In European armies veterinary surgeons attend every corps. Before that many diseases disappeared from the horses. Glanders, which killed hundreds of animals, altogether disappeared. When on the Potomac, the doctor saw this fatal disease making its fearful havoc. He was before a committee of congress relative to a bill for this purpose. The house committee favoured such a bill—the senate rejected it. Horses are condemned and sold by hundreds in Washington, having glanders. They are scattered over the country, spreading an incurable disease.

Before the breaking out of the war, glanders in horses were nearly unknown. A veterinary surgeon would at once despatch any horse having the disease. This virus of a glandered horse is fatal to man. Physicians call it equina. Out of seventy cases of equina recorded, all but three proved fatal. Mr Jennings said that in rejecting a bill to introduce veterinarianism into the army, the government had committed an oversight. The argument that influenced the committee against the measure was, that as the animals were always moving, they could not have the rest necessary for their treatment. The loss occasioned already by this neglect is very great. Contagion in some instances breaking out among cavalry and draft horses, might have been checked in its spread by destroying the infected animals. The reverse has been the case. Condemned horses, in whose system the seeds of glanders were maturing, have been sold to farmers and brought into contact with sound horses. To these they have imparted the disease. Several cases of glanders have occurred in this vicinity, where previously it was almost if not quite unknown.

Mr Jennings suggested that this college, with its graduates during the last five years, should establish a national veterinary association, and ultimately establish a veterinary journal. Dr Copman, of this college, living in Utica, is a member of the medical faculty, and is highly esteemed in the medical world. As a microscopist he has no superior. He has prepared many thousand rare specimens, showing the action of various substances upon the blood of animals. With Dr Charles Wood of Boston, and the rest of the veterinary surgeons of repute, such an enterprise could be successfully put into effect. Millions of dollars might be saved by the government in giving encouragement to such an institution.

Mr M'Clure said that he had sent to General Halleck an article relative to Mr Rarey's views as to the treatment of cavalry horses. General Halleck had sent for him, and an order was issued through General Meigs that a report should be made. This showed that more horses were killed by order of inspectors than died in hospitals for horses. The published report, however, differed from this; but why the speaker could not say. But before spring he believed the mortality among army horses would be frightful. A low typhoid form of fever sweeps away the animals. It is sometimes long in coming, but is sure to come at last; and it only appears too likely that by the time the spring opens, the army wagons will have no sound horses to draw them.

The proposed bill suggested that veterinarians should rank as sergeant-major, with pay of 70 dollars a month. The veterinary surgeon would not give his time for such a pittance, nor serve except under a commission. Yet there is no one in the army to separate the sick horses from the well, and to point out the infected from those merely debilitated.

A resolution was adopted that a committee be appointed to set on foot such a measure.



## BEVERLY FARMERS' CLUB.—FEARFUL LOSS OF HOGS BY CHOLERA—SORGHUM.

*To the Editors of the Prairie Farmer.*

OUR Farmers' Club still lives. We have held weekly meetings for over two years; if people only knew the benefit to be derived from such clubs there would not be a town in the State without one. Our subject for discussion is always announced the previous week, and our exhibitions of grain, vegetables, fruit, and flowers, together with the frequent attendance of the ladies, all help to vary and add to the interest of the meetings.

Our remoteness from either railroad or river has caused us to go most extensively into that which is the easiest marketed, and our land being well adapted to corn, hogs have been our main dependence. But we were doomed to disappointments. Less than eight months ago the hog cholera made its appearance in our midst—close on the heels of this came a set of men that very much resembled Eastern tree pedlars. They offered us receipts at from five dollars to fifty cents each, that *were sure* to cure or prevent the cholera. But as might be expected of such men, their customers were swindled. Not only their prescriptions, but all others that we have tried have proved to be of little or no value. The epidemic spread in every direction, making no distinction between the full-blood Suffolk and the long-snouted native. Having frequently seen statements of the supposed loss by this disease, we concluded to find out how many had died in this township; and also the amount of molasses made this year. We therefore appointed a committee for each school district, who, with the help of the school teachers, procured a correct list from every farmer in the town, which foots up as follows:—

Hogs died of cholera . . . . .	3564
Hogs slaughtered and to slaughter . . . . .	3193
To winter, including pigs and breeders . . . . .	2791
Gallons sirup from sorgho and imphee . . . . .	5620

We find the cholera has been particularly fatal among breeding sows and small shoats, and not very severe on large hogs that were well cared for. It has now visited about two-thirds of the farmers in the town, and still goes on regardless of cold or wet or any weather.

In the north-east quarter of our town, district No. 1, but one farmer has escaped. Their list gives—

Dead hogs . . . . .	1223
Fat hogs . . . . .	680
Stock . . . . .	452

Of the stock on hand full one half are less than one month old, and necessarily must make light hogs for another year, if they live, which, from our late experience, we do not think they stand one chance in three to do. To take four breeders for each of the thirty-one farmers in district No. 1, it will reduce their number to 328 for their next year's killing. This is but little over one quarter as many as have died within eight months, and not one half as many as the present killing, which is much less than common.

From what we can learn we have fared no worse than our neighbouring towns and counties, and as this disease has passed over almost the entire north-west, it must materially reduce our next year's pork crop.

We hope to see similar reports from other towns, as we would like to know how long it is apt to stay in the neighbourhood, and if it is apt to return again after leaving. We are highly pleased with our home made molasses; this year it is of uniform good quality. A good deal of it is now quite thick with sugar. As high as 228 gallons have been made from an acre of Chinese cane.

WILLIAM CUTTER,  
Corresponding Secretary of Beverly Farmers' Club.

## MISCELLANEA.

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**GREAT MORTALITY AMONG SHEEP IN COLL AND TIREE.**—A very alarming mortality exists among the flocks on the sheep farms in the islands of Coll and Tiree. In Coll, up to the 6th inst., about 60 per cent. of the flocks had perished, and the mortality was even greater in Tiree. On the farm of Hynish, in that island, the sheep were brought home dead in cart-loads. The cause of the mortality in Coll was unknown, but it is supposed that the disease has been caused by the continuous wet weather, Coll being a very flat island. The Tiree sheep appear to have suffered from water in the head. Latest accounts state that the mortality was undiminished, and that great despondency prevailed among the farmers.—*Greenock Advertiser.*

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## OBITUARY.

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### THE LATE SIR TATTON SYKES OF SLEDMERE.

THE death of Sir Tatton Sykes, which took place on Saturday the 21st inst., is an event which we cannot allow to pass without recording a few words in commemoration of a man whose name has been long honourably familiar to lovers of horses all over the civilized world. Sir Tatton may be said to have lived to the great age of 90 years, completed last August, in the enjoyment of the most perfect bodily health, whilst his mind to the last was clear and retentive, so that he did not forget the smallest incidents which occurred in times recent and remote.

Sir Tatton Sykes' biographer will have a most agreeable task to accomplish in portraying the many noble qualities, which were so visible as to be brought home to every one who knew the late Baronet. Were we to select any single aspect in which the character of Sir Tatton Sykes shone most brilliantly, we should feel at a loss to make the choice. To lovers of horses, and it is in that character we have had most opportunities of understanding him, his name will be proclaimed as that of the greatest breeder of horses in Great Britain; but he is equally renowned as a great improver in sheep-breeding, and following out his ancestor's efforts, had converted the Yorkshire wolds, formerly barren wastes, into one of the finest agricultural districts in the kingdom. As a practical farmer, as the best of landlords, the kindest of masters, and a benefactor to the poor, we trace the leading traits of the subject of this notice, whose memory is indelibly engraved in the hearts of Yorkshiremen. One feature of Sir Tatton's character worthy to be noticed, was, that he never in life permitted the good actions of a man to be effaced from his memory, nor did he ever allow a bad one to be impressed on it.



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### ORIGINAL COMMUNICATIONS AND CASES.

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*The Diseases of Animals in relation to Public Health and Prosperity:* Being a Lecture delivered before the Metropolitan Association of Medical Officers of Health, on the 18th of April, 1863. By JOHN GAMGEE, Principal of the New Veterinary College, Edinburgh.

GENTLEMEN,—That in a country like our own, privileged as the centre of progress in all that relates to agricultural pursuits, and singularly favourable for the breeding and rearing of all domestic animals, we should have to acknowledge that we permit the latter to be indiscriminately destroyed by disease, and submit to the wholesale consumption of diseased animal produce, is as humiliating as it is unfortunate. Words are wanting adequately to convey to the minds of many the injury inflicted on this country by our own improvidence, in fostering rather than suppressing an ever-increasing trade in diseased animals, alive or dead—a trade which constitutes at present an apparently necessary means to enable stockowners to meet losses by disease, but which is in reality the most potent of all causes favouring the destruction of our cattle. On this subject it is necessary I should somewhat enlarge. Epizootics that have from time to time attacked the herds of different countries, have been rudely counteracted by slaughter. In thinly-peopled districts this has been attended with a glut of cheap animal food, as it has unfortunately been a habit to make the most of the foulest carcasses, and, as a natural result, disease has appeared in man. In modern times a striking illustration of this may be derived from Iceland.

In the United Kingdom, until the second quarter of the present century, though severe losses had occasionally to be sustained, they were experienced at rare intervals and in special districts, so that the universal practice was to bury the carcasses of animals, victims of disease. Very frequently in the course of my travels have I met with farmers who have related what a rare event it was at one time to have a diseased or a dead bullock on a farm, and how, when pleuro-

pneumonia broke out after the importation of foreign stock, the first animals which succumbed were buried. Soon, however, a set of men sprang up, who, offering rather more than hide's price for diseased cattle, bought them up for the large towns. The number of such individuals increased, and at present there is keen competition for a cow affected in the last stage of pleuro-pneumonia, and with an ever-increasing scarcity of animal food, it is of daily, or rather hourly, occurrence that diseased town dairy cows realise from five to twenty pounds sterling. Live stock insurance companies were formed immediately after the importation of foreign diseases, and these companies found, what farmers had discovered, that it was better to kill for the butcher than to treat animals affected with disease, so that in many ways the slaughter of diseased live stock as human food has been sanctioned and encouraged. Had this wholesale contamination of our animal food supplies been attended with good results in banishing disease from our farms, we might endure the practice; but no, it has only tended to render farmers reckless, butchers dishonest, and the people poor. It has done even more. It has affected the health of the people to an extent becoming more appreciable the more the subject is investigated.

I shall strive to demonstrate to you that the system universally carried out at present is as ruinous as it is demoralising in its results, and although some may suppose such a demonstration to be scarcely necessary, others have long since declared, and still maintain, that on the outbreak, and during the continued presence of epizootics it is wise and prudent to consign the diseased animals to the butcher, so as not to deprive the people of nourishment, which it is said inflicts no injury, and can be had at a small price.

I am an uncompromising opponent to the sale of diseased meat. When I first began to study the subject as far back as 1851, I looked upon the traffic as a necessary evil. I now know it to be not only unnecessary, but most pernicious.

I shall, with your permission, consider its effects, *firstly*, on the health of stock; *secondly*, on the health of the people; *thirdly*, in impoverishing the farmers and the country generally.

*Firstly*, The diseases of animals in the United Kingdom are either indigenous or foreign. The indigenous diseases are due to local causes, the nature of which is, in the great majority of instances, known to men of science; such maladies might be readily counteracted, and, as a rule, are non-contagious. Localized, and with no tendency to spread, they have not—if I except rot and scab in sheep—at any time led to contamination of our live-stock trade, as the losses induced by them, even in the days of their most extensive prevalence, have been so limited either as to the time over which they occurred, or the average of animals they destroyed, that they have only led to an occasional outcry for qualified men to cure them. With better drainage, artificial foods, good farm buildings, attention to other means of shelter, &c., all enzootic disorders are



greatly under our control. Not so, however, with foreign diseases. A cargo of Dutch or German beasts arrives from Rotterdam or Hamburgh. The whole stock is only fit for slaughter, and it enters our ports with signs of the foot-and-mouth disease. These animals are exposed with British stock in our markets, grazed in our fields, and soon show signs of pleuro-pneumonia. We kill them out, but our own stock has been seized; the diseased continue to be slaughtered, but are also permitted to travel on roads, in railway trucks, in steamers, and to be handled by butchers in the public markets amongst animals for store purposes—and dairy cows, that are to supply our infants with milk. These animals, in their turn, become affected, and the number seized increases in geometrical proportion. Stock, in the remotest parts of our islands, are contaminated, and they are in their turn passed into the hands of dealers and butchers, and are as efficient carriers of contagion as the foreign beasts, which have perhaps infected them in a most indirect manner.

Let us suppose for a moment that when small-pox broke out in Wiltshire last year, the farmers had allowed or encouraged butchers to carry off the diseased sheep, without, moreover, adopting any other precautions. The flocks of the United Kingdom would have been very speedily contaminated, and the malady must have taken deep root throughout the length and breadth of the land. But it did not occur to the farmer, or to the butcher, that the diseased sheep should be eaten—they were buried as they died, skin and all—the districts were proscribed, energetic measures were adopted, and the malady dispersed. Our cattle happen to be large, to be individually worth more money, and we think it a serious pity to bury or to transform into manure the carcasses of a few, and the result is, that we contaminate the many. If I were to visit a farm to-morrow, where fifty head of cattle had been seized with pleuro-pneumonia, and I ordered separation and slaughter of the diseased, in addition to preventative measures for those still sound, the farmer would never dream of burying his single ox, and would consider it reckless extravagance to do so. No, he must send it to the nearest auction of live stock, to the market, or have it slaughtered, and sent to London, not knowing whether those that eat it will fatten or die on it. One animal thus often contaminates cattle carried on several different farms, and all because the farmers who first caught the disease will not make the first and smallest loss of perhaps L.20. That same man will go on losing ox after ox, or rather slaughtering animal after animal, until nearly if not all the fifty will be killed diseased, and the total loss on the price of the animals, on the wasting of food, &c., will amount to two or three hundred pounds. This is the system; and rather than spend a five-pound note in professional advice, the farmer will lose five hundred pounds by disease. The farmer's practice now is to generate disease, and sell diseased stock. I quite admit that veterinary surgeons can do little good, as a rule, when called in, and the disease raging; but what I want to see is a vigorous and talented

body of men, ready, like our fire brigades, to prevent damage, to smother flames, and attend to the property surrounding regions inflamed. The farmer cannot afford to lose his ox, and pay the veterinary surgeon, but he can afford the latter a small per-centage on the value of his live stock, provided he is thereby secured from the danger of destructive epizootics. Many are calling out for cures, whilst they are selling their diseased animals, and our veterinary surgeons are diligent in pouring physic down the throats of cattle doomed to die. Such a system can only lead to ruin; it can only lead to the farmer's bankruptcy and the veterinarian's disgrace.

I have on several occasions published information tending to prove that the foot-and-mouth disease and pleuro-pneumonia, which have been the most destructive diseases amongst live stock in this country during the last twenty years, are entirely communicated from place to place by contagion. I shall content myself this evening by adding to the mass of evidence already published on this subject, from facts furnished me by veterinary surgeons in reply to circulars issued by me on the 1st of February, 1863. I find that all the best veterinary surgeons in this country, whose opportunities are most favourable to arrive at a sound conclusion, attributed these diseases to contagion and infection. I cannot detain you by adducing the remarks of nearly three hundred veterinary surgeons, who have written me on this subject; but I am anxious to impress on the minds of the medical officers of health for the city of London, that the prevention of diseases, which are destroying the cows in this metropolis, and in other large towns, at the rate of sixty to seventy per cent. per annum, must not be proceeded with on the system adopted for the prevention of typhus and typhoid, consumption and scrofula, in the human subject. I am as strong an advocate as any person can be for fresh air, pure water, and wholesome food; but ninety-nine per cent. of the dead cows carted from the town dairy die of contagious pleuro-pneumonia; and in order to detect the circumstances which control the spread of this disease, you must not study the malady in a town dairy, but over the whole country, and the first observation you make is, that the disease is rife where the trade in cattle is active. It is unknown in purely breeding districts. Thus, if you travel Bedfordshire you will find dozens of farms on which cattle are only bred, and are not attacked by the lung disease or epizootic apthæ. We are told that in that county the cattle principally affected are those imported from Ireland and Scotland. If I take you to Scotland, they will tell you that cattle from the south—English cattle—are chiefly affected. If you visit Dublin, you will find amongst the persons who know most of these matters, that contagious diseases are carried there by the calves of Lancashire, Warwickshire, &c. Be not astonished, the system is to return what you get in the shape of disease with compound interest; and thus we learn from Rochdale that fairs are held there twice monthly for the supply of cows, which are needed to supply milk for the factory people. These cows as usual die off quickly, and



principally those from Ireland. But it is said that there is no rearing in the district, and all the calves are exported to Ireland. Thus, if Rochdale is the centre of a diseased district, like many other manufacturing towns, it is the centre to which disease not only converges, but from which it spreads to the remotest regions where calves to rear are in requisition. Whatever county I select as an illustration, it will furnish you with the most unmistakeable evidence that our cattle, our soil, our food and climate, have nothing to do with the generation of either pleuro-pneumonia or the foot-and-mouth disease; but travelling, buying and selling, transporting in steamers and railways, are the causes which lead to the approximation of diseased and healthy, and thus tend to the decimation of our stock. In Scotland, I usually adduce Lanarkshire as affording the striking contrast of absence of all contagious diseases in breeding districts, and the most alarming mortality in Glasgow and its vicinity. The county which furnishes a similar example in England is Devonshire. Plymouth and North Taunton are the centres of districts where contagious diseases have prevailed, but due to contagion, and imported from Ireland. Pleuro-pneumonia has never been seen in the superb breeding districts around Crediton, and no contagious diseases are reported from Collumpton and neighbourhood. Mr William Miller of Bradninch, in his report, says the fact that Devon is a breeding county, accounts for the immunity from contagious epizootics which prevail in those parts where foreign cattle, or cattle from a distance, have free access. Ten years' anxious study of these important questions have led me to form an opinion the very opposite of that which I was first taught to entertain. I was led to believe that the destructive epizootics of the bovine tribe in this country were non-contagious and originating spontaneously here. I now know that we may as soon expect the spontaneous outbreak of pleuro-pneumonia and epizootic apthæ in the British Isles as the spontaneous generation of wolves in Epping Forest. Gentlemen, this is not only a correct view of the subject, but a most consoling one, as it directs our efforts in the extirpation of disorders which, I assert, are easily prevented, and which are interfering more with the development of the resources of our fertile land than any other cause that can be mentioned.

*Secondly*, I have now to direct your attention to the fact that the traffic in diseased animals favours the development of human diseases. I know that you will all agree with me with regard to animals affected with parasitic diseases, and I must confess that I was taken by surprise in Ireland, when, on visiting bacon-factories, I discovered that the trade in measly pork was conducted with the greatest regularity and in accordance with rules well known to the ham and bacon dealers of the whole country. The Irish peasant, living in affectionate community with his pig, permits the latter the range of the house and adjacent roads and lanes, where human excrement and human tapeworm exist in quantities. It has been said by Dr Fleming and others that the joints of *tænia* inducing measles in the pig are derived from dogs,

but I am quite sure that the existence of measly pigs in a district is a sure sign of human beings there affected with *tænia solium*. The Irish peasant drives his pig to market, and the measle-trier nearly breaks the animal's jaws in opening the mouth with a huge stick, and with a penknife dexterously extracts the measle from a diseased pig. The measly animal is sold at a reduction, and in the absence of measle-triers, firms buy pigs on chance at a moderate rate. All the pigs are killed, and before curing all the healthy ones stamped. The bacon-factors carefully examine each carcase for measles, and when the disease is found no mark is put on the pig. It is, however, placed in pickle, and sold to the bacon dealers at a reduction of three shillings a fitch. Leuckart insists that the process of curing does not kill the parasites, and, from this, experiments are imperatively called on the subject. I am told, in Ireland, that the English bacon dealers were very constant in their inquiries for measly bacon, not knowing probably the real nature of such material, and the amount sold is enormous, as, on an average, three per cent. of the Irish pigs are measly. Sometimes eight and ten per cent. are thus diseased. I have been recently led to the conclusion, that nearly two in every thousand people in the United Kingdom suffer from eating such pork.

You are well aware, gentlemen, that it is not only the irritating tapeworm that we derive from the pig, it is the prostrating and destructive trichina which penetrates our muscles and kills. Probably there are many more cases of trichina disease than of tapeworm, and the day is not far distant when the number of well recorded cases of death due to trichina in man will convince every one that the meat-shops, slaughter-houses, and bacon-factories, must be looked after to stop the sale of dangerous bacon, just as much as we require to analyse for the adulteration of groceries.

I am, however, quite convinced that the tens of thousands of carcases of diseased animals sold in all large towns are stealing life from human beings when and where we least expect it. It is asserted by many at home and abroad that the flesh of cattle affected with pleuro-pneumonia is wholesome. I hope the day will soon arrive when we need scarcely discuss such a question in England, and if Government wishes, this can be attained; but, as the disease is here, I must say that last year my opinion became confirmed that the flesh of cattle affected with pleuro-pneumonia when eaten by man induces boils and carbuncles to an incredible extent. My observations have been made in three establishments. One where 1500 men are known to be supplied, fraudulently of course, with little else than diseased meat; another where several hundred soldiers are in the same position, and a third where about 70 individuals fed, too often to my knowledge, on the flesh of cattle affected with pleuro-pneumonia, have been seized occasionally with vomiting, diarrhoea, abdominal pains, &c., and have traced such accidents to the meat, to such an extent, that many refused to eat it. On this subject I have been



in communication with medical men who have been in attendance on the sufferers, and I regret that circumstances compel me to withhold further details.

But during the past year, and even very lately, cases have been reported to me, or been witnessed by myself, which are surprisingly disgusting, and calculated to excite alarm. In the first place, splenic apoplexy, the real milzbrand of the Germans, is increasing in prevalence in this country, and dogs and pigs fed on the flesh of animals dying of this disease have fallen victims to a kind of putrid fever. The last case reported to me was one in which the flesh of an ox that had died of splenic apoplexy was given to dogs and several ferrets, and they all died.

It is commonly supposed that the flesh of cattle that die of epizootic apthæ is wholesome, and thousands of animals with this disease are eaten in our large towns. Mr Pearce, veterinary surgeon at Whitchurch, in Hampshire, reports to me that the foot-and-mouth disease attacked the dairy-maid, and other persons about a dairy where the milk was used freely amongst them. One cow died of the disease, and was taken to the kennels, and the hounds all suffered severely. Had the Hampshire people sent that cow to Newgate market, what would have been the result?

Cases that alarm us more, perhaps, are those extremely common ones of parturition fever in cows. The malady is extremely common, and many cows that die are drained of what blood they can lose after they have breathed their last, and then carted away by the butcher. Diarrhœa, symptoms of cholera, and death have been known to result from eating such meat. But last Monday week, a case occurred in Edinburgh, which indicated most forcibly the imperative necessity for prompt interference to put a stop to the traffic in diseased meat. A cow affected with milk fever in its worst form was treated with tincture of aconite. She died, was kept warm until the butcher arrived to bleed her, as best he could, and she was then dressed and sold as human food. Is it not a disgrace that in such a city as Edinburgh, with one of the finest public slaughter-houses in the kingdom; diseased and dead cattle, drugged or not, should freely pass in and out of the abattoirs; and if the carcasses are unsightly for the butcher's stall, they should be cut up into sausages, or disposed of to preserved meat manufacturers?

I shall not detain you, gentlemen, with further evidence as to the influence of the traffic in diseased animals on the human health, except by the statement, that in my report on the Health of Stock for 1862, you will find abundant evidence of the injurious qualities of the milk of diseased animals, and such evidence, added to what has been said and printed before, should convince you that the guardians of the public health are in honour bound to exert themselves to secure the suppression of the traffic in diseased meat and milk.

*Thirdly*, I have to notice the effects of the traffic in diseased animals in impoverishing stockowners and the country at large. My calcu-

lations, made under most favourable circumstances, show that the United Kingdom never loses less than eight millions sterling by disease amongst cattle, sheep, and pigs. Half that loss is annually due to foreign contagious diseases. The facts on which my estimates have been prepared are derived from live stock insurance companies—defunct ones, it is true, but it is owing to this fact that my statistics are reliable. I can easily demonstrate that the loss on live stock must necessarily be very heavy.

We may first notice how the loss is sustained, and it is essential that I should allude separately to the stockowner's and the consumer's losses. There is an impression abroad, that if the farmer sells his diseased cattle, he cannot be a great loser; but I know from personal experience, that such an impression is entirely unfounded. An illustration will best serve my purpose to explain how the loss occurs. Five hundred pounds are expended on a lot of cattle. They are fed on expensive land for six weeks, and a case of pleuro-pneumonia occurs. The butcher pays somewhere about, and often much below, the first price of the ox. All the animal's keep is loss. A month later a second one occurs, and the cases then follow each other more rapidly; but supposing the butcher relieves the farmer of his diseased animals at their original price, which you will admit is more than many of them get, it is quite evident that if the farmer trusted, as he should, to pay a heavy portion of his rent with his money, he has it not. He has lost time and food, and many a worthy man can trace his ruin to the first lot of diseased cattle he bought.

But let us turn our attention for a moment to the town dairyman. He has fifty cows. Twenty-five years ago he could buy in fifty valuable cows in lean condition, best fitted to give a large supply of milk. His stock would not cost him more than L.600. Now he must buy meat as well as milk, to be ready for the butcher at any time, and the capital invested is double in amount. The lean cows kept on improving with the abundant food given them to ensure a good supply of milk. They sold at a higher price nine months after purchase than they were bought in at, and all the time paid for their keep, and left a profit. As a rule, the price of fat dry dairy cows of the present day is not so large as that of the same fat cows at the period of calving, and, unfortunately, very few, quite an exceptional few, are sold healthy and fat several months after having been in a town dairy.

There is no doubt that many town cowfeeders have, on the whole, made more money since contagious diseases appeared amongst us; but this paradox is easily explained. A large number of the craft used to keep cows on too long, and every pound of beef they laid on the animals that had been with them more than six or seven months, cost them two or three times as much as they could get for it. They were losers when they tried to fatten instead of keeping stock in full milk. At the present day every cow is killed out, on an average, within three months after entering the town dairy, and the stock in



hand is yielding the largest amount of milk such a stock can yield, as all the cows have recently calved. The enormous profits on the milk and wholesale dilution, save the dairyman from bankruptcy, but hundreds and hundreds of them remember the day when they had a comfortable and fairly paying business, whereas now they have to adopt the most ingenious schemes, and sell diseased meat *en masse*, in order to hold their ground. Ask the dairymen of the present day, with the great experience they have unfortunately acquired from the prevalence of disease, and they will say, 'Secure the health of our stock, and we shall soon be wealthy men.' Clever men have made fortunes notwithstanding disease; they would double and triple these in a few years, if their cows could be kept in health.

It is important to add, that the country loses more by the comparatively benignant foot-and-mouth disease than by the malignant pleuro-pneumonia. There are several reasons for this. The first malady spreads more rapidly and widely than the second, and is communicated to stock of all kinds. Pleuro-pneumonia steals its way in the most insidious manner, and kills, but the farmer, knowing that it will kill, sells. Cattle with the foot-and-mouth disease often fall so far back in condition as to lead to an enormous loss, amounting very commonly to L.2 or L.3 on each animal. The town dairymen know that scarcity of milk is the necessary consequence of the outbreak of the foot-and-mouth disease, and many of the cows have attacks of mammitis, and never recover, but linger on and occupy the place of other animals that would be earning a large daily profit.

If a dairyman with fifty cows is tormented with the foot-and-mouth disease for a couple of months, he does not lose less than two or three hundred pounds, and usually much more. This happens, and he has not lost a single animal, or, at all events, very few, by death. The only way he could keep pace with disease is by having much meat and milk to sell, whether wholesome or the reverse.

In 1862 the loss by epizootic aphtha alone in the three kingdoms could not have been far short of a couple of millions sterling. It is quite impossible to calculate the loss by such a disease, and must always be impossible, but we know that it is enormous, and a loss that truly merits the name of irretrievable.

You can readily understand, gentlemen, that if farmers and cow-feeders, losing hundreds annually, are to be found by the dozen on any market day in our country towns throughout the United Kingdom, the total sum lost to the farming community must necessarily be very large—so large that it would be the best speculation of the day for the whole country, if the necessary means were employed, and the necessary expenditure incurred, to prevent the disastrous consequences I have alluded to. I have used a wrong word, however, in calling it a speculation; for the prevention of disease in live stock is not only possible, but certain, and I assert easy, if proper steps were taken, and there is no risk of failure to calculate.

What I wish to impress on the farming community, then, is, that

heavy losers as they are by the traffic in diseased stock, they should insist on measures being adopted to institute a system which they cannot as individuals carry out. At times farmers and cowfeeders have looked upon me as their natural enemy, because I want to put a stop to the sale of diseased cattle. The day must arrive when they will be convinced that from first to last I have been their true friend, and I regret to say the only one they have had to insist constantly, and under all circumstances, on the fact that free trade in live stock, conducted without due regard to the prevention of contagious diseases, has been and is the curse of this stock-producing country since 1842.

It must scarcely be necessary after this that I should trespass on your time, to tell you how consumers suffer in pocket from the prevalence of diseases amongst cattle, sheep, pigs, &c.

I have long held that, if no other reason existed to stop the sale of diseased meat than the impositions practised on the public at large, this is sufficient to call for legislative interference. The honest butcher cannot make money like the contractor and the diseased meat vendor, who bargains to give a sound article for a sound price, and gives an unsound one. It is well known that diseased meat butchers have made fortunes, and the jobber is encouraged about the country; he roams about with a pound or two in his pockets, picks up a diseased or dying beast, and makes as much as will keep him in a state of intoxication for days afterwards. It is altogether a mistake to believe that diseased meat is sold to the poor. I have long attacked this fallacy, and have repeatedly asserted, that though many butchers with an extensive and high-class business dare not sell an article at an inferior price, they sell it at the highest. Housewives and cooks are no more judges of meat than many inspectors whom we see appointed to examine meats in some large towns. There are many diseased cattle eaten whose real state could only be told at the time of slaughter; and this most unfortunately happens with the worst forms of disease, such as splenic apoplexy. I have known cattle slaughtered for this disease after being transferred from country to town, and the beef had the appearance of the best meat that a butcher can show, and still, on all occasions when experiments have been instituted, pigs, dogs, and ferrets have died from eating such meat, and horses have died from drinking water from a pool in which some of the animals' blood had flown.

We can calculate the loss in money sustained by the people by noticing the difference in the price of beef at the present day, contrasted with the year prior to the importation of foreign stock. Beef, in 1841, sold at from 3s. 8d. to 5s. the stone. It now sells at from 5s. 4d. to 8s. 10d.; and when you consider that the amount consumed in the United Kingdom is estimated at 80,000,000 stones, if we take the increase in price during the last 22 years, in round numbers, at 2s. 6d. a stone, the meat-consuming public is paying L.10,000,000 more now for the same amount of meat than it did in 1841. The



ablest writer on this question in the United Kingdom recently contributed the following remarks to the *Edinburgh Veterinary Review*. He said:—"The best beef is now worth 1s. 2d. per 8 lbs. more than in 1851, and the advance in the best qualities of mutton is 1s. 6d. per 8 lbs., or 2¼d. per lb.! Apparently, these figures are highly favourable to the agricultural body in this country; but if free trade in stock implies high prices, how is it that home production does not keep pace with the demand? The reply to that question resolves itself simply into losses by disease, imported, we have no hesitation in saying, amongst the foreign stock."

It cannot be said, then, that poor people have had more food to subsist on since our prime cattle have been taken to the shambles diseased. We never could have expected such a result, and I am at a loss to imagine how sensible men have sanctioned the idea that it was prudent to encourage the traffic in diseased animals. Our present system is a monstrosity, developed in times of great difficulty and in times of great ignorance on all subjects relating to the diseases of stock. Our veterinary colleges have been educating men to bleed, blister, and fire. I want expert veterinarians to prevent disease. It is quite possible, and it is the proper system to encourage, that the emoluments of veterinary surgeons should increase with the farmer's profits on stock.

It may be expected of me that I should say more concerning the prevention of disease. I can sum up all to be said in this matter in two words—To prevent disease in live stock, we need INFORMATION and ADVICE. The question is—Are these articles in the market? I unhesitatingly say they are. Within the last two years, I have been gathering facts from all quarters, and an article is in the press concerning the health of stock in 1862, which will convince you that if we take a little trouble, we have both ready access to precious stores of information, and useful men to furnish us with valuable advice.

In considering the means to be adopted for the preservation of the health of live stock, we must certainly give the first place to the means whereby we can learn the whereabouts and causes of disease. Maladies peculiar to districts and counties can be counteracted by acquainting the farmers with the means best calculated to protect their interests. Thus, if we look to Devonshire, we are told that in the North Taunton district, in 1862, as many as ten per cent. of the young cattle died of black quarter, and fully fifty per cent. of sheep died of rot. Both these diseases are due to bad drainage, and the knowledge of the fact that so much money might be saved in one year should lead to efforts on the part of proprietors and farmers to improve their lands. If we go to Crediton, we find, in addition to black quarter or anthrax, that red water or enzootic hæmaturia in cattle prevailed. This only confirms the information, that if Devonshire is protected, from its position, &c., from the injurious influence of the trade in diseased animals, it has local disorders concerning which scientific men can give the most valuable advice. I have no doubt that

the Devon farmers would like to know how, until their land is drained, their cattle can be preserved in health. This also can be told them; but as people slumber until losses are being sustained, you require scientific men to watch for approaching danger; and like Admiral Fitzroy's dependants, announce that proper precautions should be taken to avoid accidents.

If we turn our attention to town dairies, no one can hope for any improvement, for any mitigation in the severity of disease, until proper officers are appointed to note occurrences, to insist on the segregation of the sick, and to indicate many ways whereby contagious disorders can be kept in check. The very few inspectors at our ports and markets only produce on the public mind an impression of false security. I have before demonstrated this, and the extent to which the best interests of the public are neglected, is proved by the words of one inspector, who said that if he was called upon to exclude from markets animals affected with contagious diseases, he must exclude 2000 animals out of Islington market on many a Monday morning. It is quite evident that the machinery we want is one which will preclude the possibility of such a congregation of diseased animals at one spot.

Questions arise rapidly in one's mind, as to how shall we protect ourselves from infected animals that do not show signs of disease? How shall we deal with our foreign stock? The questions can be answered most satisfactorily; but the time has not yet arrived for this extended discussion. Certain it is that there cannot be broader lines of demarcation than those which separate the proper systems for the prevention of disease in man and animals. Much is done to protect human health at a heavy outlay; far more can be done for the protection of live stock at little cost. Human sanitarians have to deal with the difficult problem of overcrowding, and the disturbance of poor people who cannot afford to pay for light, air, pure water, &c. We can appeal to the highest in the land, and to the wealthy and intelligent farmers, who would vigorously co-operate in carrying out judicious measures devised for the public good.

What we then require is Government interference, sound legislation, and utilizing the best heads in the country. If typhus break out in Lancashire, the Lords of the Council institute inquiries. If pleuropneumonia is raging and destroying millions worth of food for the people, we watch patiently and lazily as we have done since 1842, and look for the day when Providence will rid us from such a frightful scourge. We hope on, and devour the diseased cattle. This resignation to fate and victory of circumstances over men, are not worthy of Britain and the British people; and I trust all here may help in the noble work of directing the current of public feeling and public opinion, with a view to the introduction of wholesome reforms in relation to the management of our diseased cattle.



*Health of Stock.*<sup>1</sup> By JOHN GAMGEE, Principal of the New Veterinary College, Edinburgh.

THE three kingdoms are distinguished from each other to such an extent by individual peculiarities of soil, climate, commerce, and systems of farming, that it has been found necessary to consider separately the diseases which are reported to have prevailed in each during 1862. I therefore commence with

ENGLAND.

**BEDFORDSHIRE.**—J. E. CORNELIUS, Luton.—Epizootic aphtha due to “infection from cattle imported into the county, chiefly from Ireland and Scotland.” Affections of the respiratory organs prevailed to a considerable extent, and those of the digestive organs not so much. Parturient fever in cows was very fatal. Five pigs are reported as having died, indicating similar appearances to those recorded as having occurred amongst the fox-hounds in East Lothian.

THOS. J. RICHARDSON, Leighton-Buzzard.—Glanders and farcy rare; pleuro-pneumonia in cattle occasional; foot-and-mouth disease very prevalent. Diseases of digestive organs prevalent. Milk fever in cows common. Amongst sheep great mortality from rot, parasites of intestine, and diarrhoea of lambs.

Mr Richardson reports a case of epizootic aphtha in man, with general vesicular eruption over body; it occurred on a farmer who caught the disease from a scratch by the teeth of a sheep he was dressing.

**BERKSHIRE.**—WILLIAM BUCKERIDGE, Hungerford.—Pleuro-pneumonia prevalent amongst cattle “from cattle bought at fairs.” Epizootic aphtha common. Small-pox in sheep, and a few cases of cow-pox. In horses affections of the digestive and respiratory organs were very prevalent. Milk fever in cows was common, and mostly fatal. Red water in cattle occurred on rushy pasture.

J. W. GADSDEN, Bracknell.—Two cases of glanders and one of farcy. Foot-and-mouth disease very prevalent from “contagion, in consequence of diseased animals being exposed for sale at fairs.” In horses affections of the respiratory organs prevailed as well as skin diseases. In cows parturient fever was very prevalent, and very fatal.

Mr Gadsden reports a case of epizootic aphtha in a man, attending on diseased animals, who “had eruption in and about the mouth, and a considerable time elapsed before the man was convalescent.”

CHARLES WATERMAN, Reading.—Two cases of glanders in horses. One dog and a calf died of hydrophobia. Pleuro-pneumonia prevalent, and foot-and-mouth disease “very bad indeed,” and both mala-

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<sup>1</sup> Professor Gamgee is compelled, from the large number of reports received from the three kingdoms, to publish this month only the returns relating to England, and hopes next month to lay before the readers of the *Edinburgh Veterinary Review* the facts relating to Scotland and Ireland with his general summary.

dies were due to contagion from "the Irish beasts." Affections of the respiratory organs prevailed amongst horses. In cows milk fever was the prevailing and most fatal disorder. Sheep affected with rot.

Under the head General Remarks, Mr Waterman says, that many cows with the foot-and-mouth disease have suffered severely from inflammation of the mammæ and *sloughing* of the teats.

**BUCKINGHAMSHIRE.**—EDWARD BOND, of Buckingham.—Glanders and farcy rarely seen. Foot-and-mouth disease extremely prevalent, but pleuro-pneumonia not so much so. In horses, affections of the respiratory organs prevailed. Amongst cattle the cases of black quarter, splenic apoplexy, and red water were not numerous. All the cases of splenic apoplexy were fatal. Drainage is causing the disappearance of red water. Glossanthrax occasionally prevails in the district. Sheep have died in large numbers from rot.

**CAMBRIDGESHIRE.**—ROBERT KNOWLES, Wisbeach.—No glanders and farcy in the district. The lung disease and epizootic aphtha in cattle prevailed, but especially the latter; these diseases attributed "to cattle being bought at different fairs." Lambs were carried off in numbers by diarrhœa.

Mr ROBERTS, of Long Sutton, also reports the prevalence of the foot-and-mouth disease, and also of pleuro-pneumonia "from contagion." Affections of the digestive organs were common amongst horses, owing to bad hay, &c. Milk fever was rather prevalent amongst cows.

STEPHEN SPARROW, Cambridge.—Pleuro-pneumonia in cattle not so prevalent, but the foot-and-mouth disease "very general and very severe." Affections of the respiratory organs in the horse more than usually frequent during the summer months. One case of splenic apoplexy was seen by Mr Sparrow.

**CHESHIRE.**—GEORGE HENRY DARWELL, Knutsford.—The lung disease in cattle and the foot-and-mouth disease have been very prevalent, and due to "cattle bought at fairs." Horses suffered from influenza, with great prostration, abscesses around the throat, with difficult breathing and threatening suffocation. In cattle, splenic apoplexy, milk fever, and red water have not prevailed to any great extent.

Mr Darwell refers to the losses farmers sustain from confidence in quacks, and relying on specifics sold for the lung disease in cattle.

WALTER LEWIS, Crewe.—Pleuro-pneumonia in cattle and the foot-and-mouth disease were very prevalent, due "to contagion in general." In horses, diseases of the digestive and respiratory organs were most prevalent. Sheep suffered from foot rot. Several pigs died on a farm from eating the lungs of a cow which had died of pleuro-pneumonia.

Mr Lewis reports, that since June, 1862, he has practised inoculation for the prevention of pleuro-pneumonia in Cheshire, Staffordshire, and Shropshire. "The apparent success has been considerable." Mr Lewis has heard of several cases of epizootic aphtha in man.

WILLIAM GREGORY WILLET, Stretton, near Warrington.—Pleuro-



pneumonia and foot-and-mouth disease very prevalent, due to "infection, the result of constant interchange of stock." Black quarter in calves, and milk fever in cows, have been prevalent. Affections of the digestive and respiratory organs have been common.

Mr Willet says that, in common with his brother, he attributes the great prevalence of diphtheria in his district to the consumption of diseased animal produce. The diseased meat from his neighbourhood is taken to a great extent to the Manchester and Liverpool markets. Mr Willet strongly condemns the trade in diseased cattle as the cause of pleuro-pneumonia and epizootic aphtha.

**CORNWALL.**—B. GARNER, St Ives.—Pleuro-pneumonia and epizootic aphtha extremely prevalent, and chiefly amongst Irish cattle. Black quarter was very prevalent and always fatal. Milk fever in cows common. Influenza common amongst horses. Parasitic lung disease in calves common. Mr Garner reports that he has been a sufferer from an attack of epizootic aphtha.

E. S. TUCKER, Molenick, St Germans. — Pleuro-pneumonia and foot-and-mouth disease prevalent, and due to infection. Black quarter and milk fever very common and fatal. Red water in cattle very prevalent in the Cornish moors in the months of June and July. Many horses have been attacked with broken wind. The lung disease in lambs was less fatal in 1862 than it had been for many years past. Rot in sheep was common on marshy lands.

**CUMBERLAND.** — JAMES HETHERINGTON, Carlisle. — Pleuro-pneumonia and foot-and-mouth disease very prevalent. Sheep, in large numbers, destroyed by rot. Horses were very healthy in 1862.

**DERBYSHIRE.**—JOHN BARKER, Bolsover, Chesterfield.—Pleuro-pneumonia not very prevalent. Foot-and-mouth disease very common and very severe in newly-calved cows, attended with alarming symptoms, mammitis, total loss of milk, &c. Mr Barker says, "that the foot-and-mouth disease mostly comes from fairs and markets, and particularly with animals travelled by rail." Milk fever in cows very prevalent. Black quarter less than usual, and red water hardly known in the district.

THOMAS M. LEECH, Bakewell.—Pleuro-pneumonia in cattle prevalent, and due to contagion. Epizootic aphtha very prevalent, and due also to the same cause from cattle imported from Ireland and Yorkshire. A fatal case of splenic apoplexy occurred in a valuable bull, a portion of its flesh was given to a dog and some ferrets, and all died. In horses there were many cases of influenza, pneumonia, pleurisy, and hydrothorax. Traumatic tetanus had been frequent; and foals have suffered from arthritis, with suppuration, under which they generally sank. Many sheep died with inflamed lungs.

JAMES MARTIN, Chesterfield.—Pleuro-pneumonia and epizootic aphtha "very prevalent," and due to "importations and atmospheric influences." Black quarter extremely prevalent, and the same may be said of milk fever in cows. Amongst horses the most common diseases were those of the digestive organs.

THOMAS SHENTON, Bakewell.—Pleuro-pneumonia and epizootic aphtha prevalent. Mr Shenton says, "I have in almost every instance of the outbreak of pleuro-pneumonia been able to trace it to contagion, and the same in many instances with the foot-and-mouth disease." Yorkshire has supplied us with both, and the Irish cattle brought into our neighbourhood have made sad havoc in valuable stocks. Milk fever has been common amongst the cows of the smaller farmers, "who generally have their stocks in higher condition than the larger ones." Horses suffered much from disease of the respiratory organs, and also from mange. Inflammation of the lungs was prevalent amongst sheep.

DEVONSHIRE.—EDWARD LEACH, North Taunton.—Few cases of pleuro-pneumonia and foot-and-mouth disease amongst sheep; not many cases amongst cattle. Black-quarter attacked ten per cent. of the young cattle from six to fourteen months old. Red water was also very prevalent. Milk fever common on rich meadow lands. Horses suffered from laryngitis, bronchitis, and spasmodic colic. To the west of North Taunton, fully 50 per cent. of the sheep died of rot.

WARNE RADDALL, Plymouth.—Glanders and farcy prevailed more amongst horses than for several years past, and this is attributed by Mr Raddall to the wetness of the season. Pleuro-pneumonia not prevalent for 12 months, but the foot-and-mouth disease very common; both these diseases are due "to contagion, and imported from Ireland." Black quarter in cattle prevailed extensively in some districts, particularly on undrained lands. Red water was extremely prevalent last summer. Affections of the respiratory organs commenced amongst horses. Rot and diarrhoea prevailed much amongst sheep. Pigs were attacked with a singular disease of the head, in which small inflammatory patches occurred in the forehead, which speedily ran into gangrene, and death occurred in about 10 or 12 hours.

Glossanthrax is occasionally seen amongst cattle in the neighbourhood.

WILLIAM WARD, Crediton.—Pleuro-pneumonia has never been in that part of Devonshire, and the foot-and-mouth disease very rare. The most prevalent disease amongst cattle have been black quarter and red water in cattle. Horses have suffered principally from disorders of the digestive organs. Sheep have died of rot, and pigs of inflammation of the bowels,

WILLIAM MILLER, Bradninch, Collumpton.—No pleuro-pneumonia or foot-and-mouth disease. Mr Miller says, that Devon being a breeding county, accounts for the immunity from contagious epizootics which prevail in those parts where foreign cattle, or cattle from a distance, have free access. Horses have suffered from affections of both digestive and respiratory organs. Quarter-ill common in the district, as also red water. Parturient fever common in the best months of summer. Rot has destroyed thousands of sheep. Pigs



were seized with an unusual disease, which proved very destructive amongst them in 1862.

**DORSETSHIRE.**—R. S. BLAKE, Wimborne.—Stock was very healthy in 1862. The district is a breeding one, and no contagious diseases were seen, with the exception of a few cases of foot-and-mouth disease in cows, sheep, and pigs. Milk fever and red water were slightly prevalent. Farm horses suffered chiefly from colic.

JOSEPH REDWOOD, Dorchester.—Mr Redwood reports the great prevalence of pleuro-pneumonia and the foot-and-mouth disease, and says:—"I really am not aware of any single instance which could not be clearly traced to contagion." Black quarter prevailed amongst sheep. Milk fever was very prevalent, and red water in cattle is common on unreclaimed and undrained lands, especially on the lias clay land, and much more rarely on the chalk.

Horses suffered much from catarrhal affections, and diseases of the respiratory organs. Mr Redwood says that catarrhal affections have been very prevalent, and, in the majority of cases, attended with the development of large abscesses in various parts of the body. Old horses have been greater sufferers than young ones. Strangles in colts have assumed alarming forms, such as purpura and secondary abscess, at intervals of a fortnight or a month after the primary one. Mr Redwood adds, "During my experience I have had nothing to compare with it."

JAMES RENDLE, Beaminster.—Cattle have suffered from the foot-and-mouth disease "from contagion." No other disease has prevailed to any greater extent in Mr Rendle's practice. Horses have suffered chiefly from colic.

It is evident from these reports that the disease has been localized to a great extent in Mr Redwood's district. Many diseased animals, we are told, are slaughtered as human food, and it is said that they are eaten by the convicts at Portland, amongst whom boils and carbuncles are prevalent disorders, amounting at times to 40 and 50 cases in a month out of 1500 individuals. Other causes may contribute to the development of these carbuncles, but we know that they constitute the very diseases usually attributed to the consumption of unwholesome meat.

**DURHAM.**—CHARLES HUNTING, South Hetton and Seaton Delaval.—"Pleuro-pneumonia has been more frequent during 1862 than for several years past, and in all cases but one it could be satisfactorily traced to contagion." Concerning the foot-and-mouth disease, Mr Hunting says that "it was exceedingly prevalent in the district for three or four months after Newcastle fair in October; hundreds of animals caught the disease from those bought at the fair, and it was accompanied with much more fever than usual." With reference to the contagious nature of these diseases, Mr Hunting says, "Scores of farmers in this district will give as much as L.3 or L.4 per head more for milch cows from a neighbour, where they are sure di-

sease has not existed, than attend the large markets of Newcastle and Darlington."

Parturient fever has been very prevalent, but red water less than usual. Glossanthrax occurs in this district, but is not very general.

**ESSEX.**—J. HALL BROWN, New Wanstead.—Pleuro-pneumonia in cattle and the foot-and-mouth disease have been unusually prevalent. Mr Brown attributes the cattle disease "to a very great extent from contagion." Milk fever has been very prevalent amongst ewes, and red water occurs greatly in young cattle. Horses have suffered chiefly from affections of the respiratory organs.

Mr Brown says he has seen several cases of eruption in man precisely similar to the epizootic aphtha in animals.

JOHN JOSEPH HAZELL, Great Bromley.—Pleuro-pneumonia and the foot-and-mouth disease have been very prevalent. Milk fever in cows rather severe. Black quarter and red water in cattle rare. Glossanthrax occurs occasionally in the district. Horses have suffered rather severely from affections of the digestive and respiratory organs. Purpura hæmorrhagica attacked five animals that came under Mr Hazell's notice. Mr Hazell adds, "I have known the human subject suffer from eating diseased meat."

Mr CLEMENT HENRY HURRILL says, "pleuro-pneumonia in cattle is prevalent at times throughout the year, but decidedly not so much in 1862 as in former years; it occurred chiefly amongst lean stock, and more particularly amongst the Irish and Dutch breeds." The foot-and-mouth disease has been very prevalent, attacked pigs, and killed many of the young ones. Mr Hurrill adds, "I have also known many calves die from suckling diseased cows." Referring to both pleuro-pneumonia and the foot-and-mouth disease, Mr Hurrill says that they are infectious and contagious, and introduced chiefly by cattle bought at fairs and markets. Black quarter, milk fever, and red water are rare in the neighbourhood. Affections of the respiratory and digestive organs have prevailed amongst horses. Mr Hurrill refers to a disease in pigs which seems to be the carbuncular angina of continental authors; he says that *immense* enlargements occur around the throat, with effusion of serum under the skin, and if neglected, the disease soon proves fatal.

Mr Hurrill adds the following very interesting facts:—

"I am pleased to say that some of the diseases mentioned in your schedule are seldom seen here, as you will observe from the answers I have given. Pleuro-pneumonia has been the great scourge under which the farmers have suffered here for some years past; but as they have become more careful in their selections and purchases of beasts, the prevalence of the disease has certainly become less. The chief breeds that are introduced, grazed and fattened in this country are Highland and Galloway, Scots, Welsh, and Irish; a few Herefords, Dutch, and Sussex, and occasionally Devons. Many of the short-horn breed are kept, generally bought-in-calves, and are weaned, grazed, and fattened without ever changing hands. These sometimes



suffer from the complaint, traceable to nothing definite. The greatest ravages occur amongst the "Irish," and "Dutch." Next to them, although not near so frequently, it takes Welsh and Highland Scots, and the least affected are the Galloway, Hereford, Sussex, and Devon. There is a farm near here where the proprietor always sent poor Irish beasts to winter, allowing them pasturage during the day, and a yard, &c., at night. The disease generally broke out every season, soon after their arrival, and would continue more or less until they were turned out. By our (my father and self) advice, after they had left in the spring, every post, rail, manger, crib, etc., was thoroughly scrubbed with soap and hot water, and afterwards rinsed with a dilute solution of zinci chlor., the yards were cleaned out, and kept so all summer. Strange to say, not above one case took place in the fresh beasts during the ensuing winter, and I think, after repeating the scrubbing, &c., in the second spring the disease entirely disappeared. We have tried it on a second farm with the same success, but whether that success depended upon the disinfecting properties of the zinci chlor., or whether the beasts were less susceptible, I must leave in better hands than mine for trial and judgment. The beasts belonging to the first yard were brought in every autumn, generally about 40 in number, ranging from two to three years old."

Mr ISAAC SEAMAN, Saffron Waldon, says that glanders and farcy are frequent amongst horses in his district. Pleuro-pneumonia in cattle, and foot-and-mouth disease *very prevalent*, which he attributes to exposure, &c. Milk fever in cows very prevalent. Glossanthrax is a frequent disease in this district. Amongst horses, affections of the digestive organs were the most prevalent. Mr Seaman refers to the same disease in pigs that Mr Hurrill notices, and which he calls cynanche tonsillaris. He also reports that, to his knowledge, some cases of death occurred a short time ago in London, from eating sausages made of pork sent from Northampton.

H. WEBB, New Sampford.—Pleuro-pneumonia in cattle has been extremely prevalent, and there were more cases of it in 1862 than Mr Webb has known during the previous 11 years that he has been in practice at New Sampford. Foot-and-mouth disease very prevalent, and both diseases usually occur in the district about October, which is the period for the purchase of fresh stock. Horses have suffered from diseases of the respiratory and digestive organs to a great extent. A great many lambs died from parasitic lung disease and gastric fever, which we presume is the malady so often noticed connected with the ravages of *strongylus contortus*.

**GLOUCESTERSHIRE.** — JOHN BLUNSOM, Cirencester. — Pleuro-pneumonia rare, and foot-and-mouth disease very prevalent. Milk fever in cows was common, but black quarter and red water less than usual. Affections of the respiratory and digestive organs in the horse prevailed to a great extent. Abortion was very prevalent amongst ewes, and diarrhoea amongst other sheep.

CALEB T. MORGAN, Standish.—Pleuro-pneumonia prevailed exten-

sively, and principally by the animals being crammed into railway trucks. The foot-and-mouth disease was very general, and, to some extent, also black quarter. Parturient fever and red water abound in cattle. Horses suffered more from affections of the respiratory organs than of the digestive system.

JOHN PARADISE, Dursley.—Pleuro-pneumonia and the foot-and-mouth disease very common, owing to "contagion and infection." Black-quarter and parturient fever rather common in cattle. Sheep much affected with rot.

HAMPSHIRE.—J. D. BARFORD, Southampton.—Sheep have suffered from the foot-and-mouth disease, but cattle only slightly. Pleuro-pneumonia is rarely seen in the district, and did not occur in 1862. Parturient fever very common in cows. Horses were remarkably free from affections of the respiratory organs, but suffered more, as they always do, from colic. Two cases of purpura hæmorrhagica occurred.

CHARLES SMITH GREEN, Winchester.—In 1862 diseases in all kinds of animals have been less prevalent than I have ever known them in the course of twenty-four years' practice. A few cases of foot-and-mouth disease occurred. None of pleuro-pneumonia. Cases of paraplegia or 'loin-fallen' in cows rather common, associated with debility. Horses have suffered chiefly from sore throats and colic. Mr Green has observed the eruptions of epizootic aphtha in children, and sometimes in adults.

JOHN B. GREGORY, Portsmouth.—Pleuro-pneumonia prevalent, and foot-and-mouth disease occasional. "The general opinion of the public here is that the above diseases are caught from infected animals either in the markets, fairs, or railway trucks." Milk fever prevailed amongst cows. Affections of the organs of respiration and digestion frequent. Mr Gregory remarks that ophthalmia in horses is rarely seen there.

J. H. PEARCE, Whitchurch.—Not seen a case of pleuro-pneumonia for four years. A gentleman then lost nearly the whole of his dairy stock, about twenty cows, at that time, from buying a diseased cow at a fair. Several cows and sheep have been affected with epizootic aphtha, and the dairymaids, and other people about the dairy where the disease appeared, became affected with diarrhœa after drinking the milk of the diseased cows. One animal died and was taken to the kennels; the hounds were affected in the same way, and the meat was discontinued, after which the hounds recovered. Several cases of milk fever have been seen. Horses suffered principally from colic, owing to the practice of farmers working their horses without food from seven o'clock, A.M., to four o'clock, P.M.

THOMAS REDFORD, Bishops Sutton.—Contagious diseases were limited to twenty-two cases of epizootic aphtha, which were due to "contagion from a herd of beasts proceeding from Hartley Row fair." The only other important disease in cattle was milk fever. Affec-



tions of the digestive and respiratory organs prevailed to a moderate extent in horses.

**HEREFORDSHIRE.**—JOHN JONES, Leintwardine.—Pleuro-pneumonia has not occurred. The foot-and-mouth-disease prevailed, owing “to contagion.” Black quarter, milk fever, and red water in cattle occurred to a moderate extent as usual. Diseases of the respiratory organs were more prevalent amongst horses than those of the digestive organs.

**HERTFORDSHIRE.**—JAMES A. CHURCHILL, Watford.—One case of glanders occurred in a pony after an attack of influenza. Horses were, on the whole, healthy in 1862. Very few cases of pleuro-pneumonia occurred, but epizootic aphtha prevailed much amongst milch cows, and was “brought amongst them by fresh purchases, particularly from the London markets.” Milk fever prevailed amongst the better fed cows. Pigs suffered from the foot-and-mouth disease.

HARRISON PROCTER, Hertford.—Pleuro-pneumonia occurred in one locality, where there were twelve deaths. The foot-and-mouth disease was prevalent, and due to infection. Milk fever in cows prevailed. Horses, on the whole, healthy.

A. PRUDAMES, Great Berkhamstead.—Influenza in its pneumonic form has been very general among horses. Low typhoid fevers have been prevalent among cattle. Tolerably free from pleuro-pneumonia, but foot-and-mouth disease, particularly among cattle, had prevailed to a considerable extent previous to the last three months, “commonly attributed to contagion.” Affections of the respiratory organs have raged with considerable violence throughout the winter and still continue. Eczema epizootica has prevailed among sheep and pigs, also fevers and various blood diseases among the latter animals.

**HUNTINGDONSHIRE.**—ALFRED FULLER, Ramsey.—Pleuro-pneumonia not quite so prevalent as in former years, and chiefly amongst Irish cattle. The foot-and-mouth disease prevalent, and due to infection. Black quarter and red water in cattle are disappearing with better drainage. Milk fever in cattle common. Glossanthrax is occasionally prevalent in cattle. Horses healthy in 1862. Sheep destroyed to a great extent by diarrhœa.

**KENT.**—E. T. BASS, Lydd.—Pleuro-pneumonia is the great bane of the cattle-farmer, and occurring principally amongst beasts imported from Ireland. Foot-and-mouth disease common. Milk fever in cows common. Black quarter rare, and red water in cattle rather more prevalent. Horses suffered much in 1862 from diseases of the digestive and respiratory organs, and sheep from rot and foot rot.

W. BENTLEY, Margate.—Pleuro-pneumonia and the foot-and-mouth disease were prevalent. In the Isle of Thanet, pleuro-pneumonia was less destructive this year than it was ever known before. “It is always traced to the purchase of fresh stock on the farms in a diseased state from the fairs.” Milk fever is the only other fatal disease on the island. Horses suffered considerably from diseases of the organs of digestion and respiration.

A. E. CONSTANT, Ramsgate, only reports the prevalence to a moderate extent of diseases of the respiratory organs in horses and of colic. A case of albuminous urine occurred in a colt, and one case of glanders, and two cases of farcy in a large stud of horses.

WILLIAM COOK, Willesborough.—Pleuro-pneumonia and epizootic aphtha very prevalent. Milk fever in cows has greatly increased in frequency of late, and in 1860 splenic apoplexy destroyed many cattle on one farm. Glossanthrax occurs occasionally, and two cases were seen in 1858. In horses the principal diseases, as usual, were those of the organs of digestion and respiration.

CHARLES CROWHURST, Maidstone.—The year 1862 was healthy. A few cases of pleuro-pneumonia, especially amongst Welsh beasts and other “drifted cattle.” The foot-and-mouth disease was prevalent and severe. Milk fever in cows also rather common. In horses attacks of colic and influenza most frequent. Pigs have suffered from the blue disease, implicating the skin and the alimentary canal.

J. T. W. SMITH, Tunbridge Wells.—Very few cases of pleuro-pneumonia. None of the foot-and-mouth disease. Milk fever in cows very prevalent, and a few cases occurred of black quarter and red water in cattle. Affections of the breathing and digestive organs common amongst horses. Sheep suffered from foot rot.

LANCASHIRE.—JOHN AKED, Blackburn.—Pleuro-pneumonia in cattle and epizootic aphtha have been extremely prevalent, and due to “contagion.” Milk fever in cows was very prevalent. Mr Aked reports that there are two or three cases of glossanthrax in his district every year. Sheep much affected with rot. Horses suffered chiefly from diseases of the digestive organs.

On the effects of the milk of diseased animals, Mr Aked says, “I have frequently seen children here suffering from disease which, in my opinion, is similar to epizootic aphtha.”

Mr Aked adds, “The sale of animals labouring under contagious diseases, and the traffic in diseased meat, are carried on to an alarming extent. The ignorant and superstitious notions displayed by the generality of owners of cattle respecting the diseases and proper treatment of stock, is only equalled by the ignorance of the quacks they call in to attend them. I have frequently seen cattle suffering in the last stage of pleuro-pneumonia, and other equally contagious diseases, standing side by side with the healthy ones, until becoming alarmed at the loss of a few, they have sold the remainder, contaminating as many different stocks as the number of infected cattle sold.”

GEORGE BROWN, Oldham.—Pleuro-pneumonia and epizootic aphtha very prevalent. Milk fever prevalent, due to the forcing of cows with brewers’ grains, oil-cake, and Indian corn. With regard to horses I may observe, that the past year has been, on the whole, a healthy one. We had pneumonia of a low type prevailing for a short time, but it soon passed away. Diabetes is a very common disease amongst horses in this neighbourhood.

JOHN HARRIS, Preston.—The foot-and-mouth disease extremely



prevalent, but pleuro-pneumonia not so much. Parturient fever in cows has occurred, but not of a very severe form. Foot-rot and rot were the principal diseases amongst sheep. Horses healthy.

JAMES HOWELL, Rochdale.—“Through the want of employment for horses, owing to the distress in the district, it is a remarkable fact that we have not met with anything approaching the number of acute cases, accidents, &c., as we usually do. Cows, I think, have been more unhealthy. Pleuro-pneumonia, epizootic aphtha, milk fever, indigestion, &c., are the most prevalent diseases I have been called to attend.” Concerning pleuro-pneumonia and the foot-and-mouth disease, Mr Howell says they are due “chiefly to many importations of cows for the supply of milk to the inhabitants of the town, who consume milk to a great extent for porridge. We have a good market the first and third Monday in each month. A great many calving and new calved cows are brought to them. In some markets there are a great many from Ireland which had been brought to Liverpool during the Saturday night, and then by rail to Rochdale on the Sunday. As a rule, there is but little rearing of stock in this locality; the calves are mostly bought up and sent to Ireland for rearing.”

With regard to glossanthrax, Mr Howell says, “*Blain*, commonly called here *Tinge*, is not of frequent occurrence. In a practice extending over twenty-five years, several of which were spent in the dairy districts of Gloucestershire, I have failed to detect the dreadful disease described by Youatt. The large bladders or vesicles on the tongue, which he describes, I have never met with.”

GEORGE KIRKHAM, West Derby.—Foot-and-mouth disease very prevalent—pleuro-pneumonia less so. “My opinion, is that both diseases are very infectious and contagious.” Black quarter, splenic apoplexy, and red water do not occur in the district. Had a large number of cases of parturition fever amongst high-fed cows. Horses; as usual, suffered from ordinary diseases of the organs of digestion and respiration.

ENOCH LAWTON, Ashton-under-Lyne.—“The diseases most prevalent about here in cattle are milk fever, lung disease, foot-and-mouth disease, a slight case or so of pure pneumonia, colic, and many cases of chronic cough, termed ‘hoose.’” Pleuro-pneumonia and the foot-and-mouth disease were extremely prevalent in 1862, and due to contagion.

“In horses we have influenza, and all diseases of the chest and digestive organs, with, of late, a great many cases of diabetes, and, perhaps, above the usual per-cent. of inflammatory action of the bowels.”

PETER TAYLOR, Manchester.—Pleuro-pneumonia and the foot-and-mouth disease to a great extent, and both diseases Mr Taylor considers to be contagious. In horses, the principal diseases were those of the organs of respiration and digestion. Three cases of purpura hæmorrhagica were seen by Mr Taylor. Mr Taylor adds, “I had a case of a butcher’s 3-year-old pony suffering from the foot-and-mouth disease.”

**JOSEPH WELSBY, Prescott.**—From 60 to 80 cases of pleuro-pneumonia were seen by Mr Welsby in twelve months. The foot-and-mouth disease was very common; and both maladies were due to ‘contagion.’ Milk fever in cows was very prevalent. Horses suffered much from influenza, and especially throat affections with deep-seated abscess. Diseases of the digestive organs were not so prevalent as during years when potatoes and turnips are plentiful, and horses fed on them. Sheep suffered principally from scab and foot-rot.

**LEICESTERSHIRE.**—**WILLIAM M. BROOKS, Breedon.**—A few cases of pleuro-pneumonia. This disease “often commences in beasts that have come from fairs or markets.” Foot-and-mouth disease very prevalent, and “generally arises from cattle that have been bought at fairs, and bring the disease with them.” Black quarter and parturition fever occasional. Horses have suffered principally from colic and influenza.

**E. GARTON, Loughborough.**—Few cases of pleuro-pneumonia compared to preceding years. Most of the cattle affected with the foot-and-mouth disease. Horses have been healthy on the whole, but affections of the respiratory organs are common. Sheep have been lost in large numbers from diarrhoea.

**CHARLES GRAY, Kilworth.**—Pleuro-pneumonia is the most common disease, and one which is dreaded the most by our graziers. They are quite aware of its infectious nature. When an animal becomes affected it is sent off, generally to London, and is there disposed of for human food, and its fellow-companions are usually sent to some market or fair and sold. We want a legislative enactment as regards this disease.

The foot-and-mouth disease was very common last spring, and continued more or less throughout the summer. Black quarter was very common last autumn, and parturition fever very common and fatal during the summer. Horses suffered chiefly from influenza.

**MATTHEW HACK, Leicester.**—Many cases have occurred of pleuro-pneumonia in cattle, but it has not “spread through whole herds to the same extent as the year 1861, which I attribute to the immediate removal of diseased animals as soon as detected.” The foot-and-mouth disease has been very prevalent amongst cattle, and very malignant. As to the causes of the above disease, Mr Hack says, “the exposure of diseased animals for sale in public markets, their transit by rail or otherwise. I believe railway trucks to be frequent sources of infection.”

A great many cases of milk fever in cows occurred in Leicester and the county. Black quarter is rare. Setons, with an occasional alterative, are used successfully as preventatives. Horses have suffered from laryngitis, pleurisy, influenza, colic, &c.

Speaking of the communication of the foot-and-mouth disease to man, Mr Hack says, “I have heard of cases, but never had one come under my own observation. The milk of cows affected with the disease will in most cases kill the calf if it is allowed to suck.”



WILLIAM ROWLAND, Loughborough.—Pleuro-pneumonia and foot-and-mouth disease prevalent; attributed to beasts bought at fairs some distance from the locality. In horses Mr Rowland saw two cases of glanders, and the usual affections of the organs of digestion and respiration. Sheep have suffered from disease of the lungs and liver. The disease was at first taken to be rot, and the animals wasted, but no flukes were found in the liver.

**LINCOLNSHIRE.**—J. CHAPMAN, Gainsborough.—Pleuro-pneumonia and foot-and-mouth disease prevalent, “evidently from contagion.” On the farms where the disease has recurred several years in succession, Mr Chapman has recommended the grazing of sheep for one year with the best effect. Black quarter is a disease disappearing from the district, and red water in cattle is little known from the great improvements in draining; it was very prevalent a year ago. Parturient fever was common, and kept in check by preventatives, such as bare pasturage and forced exercise.

Amongst horses a few cases of glanders are to be found, amongst the horses used for boating or dragging the boats on the rivers. Affections of the respiratory organs were very severe about the end of January 1862, with the wind E. & S.E. February also, numerous cases; less in March and April. In May, with a S.E. wind, the form of affection was peculiar, as, combined with the attacks of pneumonia, there was great abdominal irritation and prostration. In the summer and autumn these diseases were less frequent, and became more prevalent the last three months of 1862. Affections of the digestive organs prevailed chiefly in the months of January, October, November, and December.

Glossanthrax occasionally occurs amongst young stock, and is generally very fatal.

HENRY CUTTING, Luddington, Goole.—Pleuro-pneumonia and the foot-and-mouth disease have been somewhat prevalent, and attributed, “as a rule, to importation of infected animals having the diseases lurking in their systems, and developed by change of air or food,” &c. Of black quarter or milk fever there occurred a few cases. Horses generally healthy.

THOMAS DARBY, Louth.—Pleuro-pneumonia occurred to some extent amongst milch cows last summer. Epizootic aphtha was very prevalent, and due to cattle sold by jobbers in markets. Milk fever in cows was very fatal last summer, owing to the abundance of grass. Affections of the digestive organs prevailed to a great extent in horses, from irregularities in feeding, and working the animals too long without food. Lambs suffered very much from coughs and diarrhœa.

JOHN GEORGE DICKINSON, Boston.—Pleuro-pneumonia in cattle, and the foot-and-mouth disease have been very prevalent, and due to “contagion.” Parturient fever very prevalent amongst cows. Two cases of glossanthrax occurred in Mr Dickinson’s practice. Six cases of glanders in horses on one farm. Nine more horses on the same

farm had a discharge from one nostril, with great debility, but the symptoms yielded to arsenical treatment. Sheep have been very unhealthy, owing to rot, scab, and a form of pleura-pneumonia.

ROBERT W. DOBSON, Holbeach.—The year 1862 was exceptionally healthy. Pleuro-pneumonia occurred in recently purchased cattle especially “drape” cows. Foot-and-mouth disease rather prevalent. Horses were very healthy, and so were the smaller domestic animals.

CURTIS HUTSON, Market Raisin.—Pleuro-pneumonia and the foot-and-mouth disease extremely prevalent, and due to contagion. From ten to fifteen cases of black quarter occurred amongst year-old calves. Splenic apoplexy rare; only three cases, of which two proved fatal. Milk fever rather prevalent, but yielded to treatment. Red water extremely prevalent amongst sheep, but rare in cattle. Diarrhoea prevailed to a great extent amongst sheep. Diseases of the respiratory organs were common, and fatal in horses. Affections of the alimentary canal common, but readily relieved.

RICHARD METHERELL, Spalding.—Pleuro-pneumonia and the foot-and-mouth disease occurred to some extent. Milk fever was common in cows. Amongst horses there occurred a few cases of glanders, an average number of cases of disease of the digestive organs, and not many diseases of the organs of respiration. Sheep suffered from diarrhoea and foot rot; pigs from pneumonia and paralysis.

A. H. SANTY, Market Deeping.—Many cases of pleuro-pneumonia in cattle and the foot-and-mouth disease. Milk fever rather prevalent. A few cases of black quarter. Horses suffered chiefly from catarrh and strangles. Two cases of purpura hæmorrhagica occurred, one of which proved fatal.

THOMAS B. SHARMAN, Old Leake.—“The past year has been about an average one, taking into consideration the various disease to which horses, cattle, and other animals are liable, but epizootic aphtha and scab in sheep have exceeded their accustomed prevalence.” Pleuro-pneumonia in cattle has, in many cases, been of a very fatal character. Milk fever is very common in the neighbourhood of Leake, and the cases occur at all times of the year, but seem to yield best to treatment in the winter. Horses were, on the whole, healthy.

GEORGE THOMSON, Horncastle.—Pleuro-pneumonia in cattle very fatal, and especially prevalent in the months of June, July, and August last year. The foot-and-mouth disease has been more prevalent than in any former year in Mr Thomson’s experience. Both diseases are “easily traced to healthy animals coming in contact with diseased ones in our fairs and markets, or from farmers buying diseased animals, and taking them amongst healthy ones. Milk fever was extremely prevalent, especially in the months of March and April. During the whole of 1862, the cases of difficult labour in cows were numerous. The diseases most prevalent amongst horses have been those of the digestive organs.

JOHN WATTAM, Stamford.—Pleuro-pneumonia appeared about



autumn, owing "to drifted cattle exposed on the road and rail, and the disease spreads by infection." Mr Wattam witnessed some cases of black quarter, splenic apoplexy, and parturient fever in cows. Red water prevailed amongst sheep. Amongst horses, the principal diseases were those of the respiratory organs.

GEORGE WENTWORTH, Lacey, Great Grimsby.—Pleuro-pneumonia and the foot-and-mouth disease were very prevalent in this district in 1862. Mr Wentworth says, "Nearly all cases of *eczema epizootica* are traceable to infection, and no doubt the majority of the cases of pleuro-pneumonia are attributable to the same cause; yet we have a great number of isolated cases, where no such cause can exist." A few isolated cases of splenic apoplexy occurred, but not so many as in 1861. Milk fever was common, and red water was confined to the cows of one village.

Amongst horses, the diseases of the digestive organs were below the average, but the diseases of the organs of respiration were very prevalent. Two cases of *purpura hæmorrhagica* occurred, and several which Mr Wentworth calls *scarlatina*.

The most common diseases amongst sheep have been congestion of one or both lungs, and a kind of enteritis, accompanied with diarrhœa, which has been very tedious, and, in a great number of instances, fatal.

ROBERT WILSON, Caistor.—Pleuro-pneumonia had broken out in isolated yards several miles apart. The foot-and-mouth disease was very prevalent in the spring and autumn months. Black quarter frequent. No splenic apoplexy in 1862. Milk fever in cows very prevalent the whole year round. Red water in cattle prevalent on special ill-drained pastures. Horses suffered from diseases of the organs of digestion and respiration.

The losses amongst sheep in the Lincolnshire wolds are enormous every year. The ewes die of red water, and the lambs in the autumn of diarrhœa. "At the present time I may safely say that there are hundreds of ewes casting their lambs every day."

MIDDLESEX.—JOHN BROWN, London.—Has little to report respecting diseases of horses. Diseases either of respiratory or digestive organs very few. No cattle practice.

WM. CLERK, Islington, London.—Reports glanders and farcy to a very moderate extent, but affections of the respiratory and digestive organs very prevalent among horses, also *purpura hæmorrhagica* as a sequel to catarrh, &c. Has nothing to report on diseases of cattle, sheep, or pigs.

JOHN R. COX, London.—Has seen glanders and farcy in horses to an inconsiderable extent. Affections of the respiratory organs have been very general throughout the year. Of the digestive organs about the average number. *Purpura hæmorrhagica* of rare occurrence during past year.

JOHN HARDY, London.—Has had ten cases of glanders, "nine of which belonged to one party." "Farcy, seven cases all belonging to

one person." Saw several cattle at the Christmas show, with foot-and-mouth disease. Catarrhal affections and affections of digestive organs rather frequent.

**WILLIAM J. HINGE**, Hounslow.—Pleuro-pneumonia in cattle not so prevalent as formerly, but the foot-and-mouth disease very prevalent in the autumn, "from attending the public markets, and fairs more particularly." "I had last autumn, at a farm I attend, six cows out of seven down at one time, all from a herd of steers stopping on the green outside the gates, where these cows passed to go to water, and many other cases from similar causes." Many cases of parturient fever, attributed to the rich herbage, and the cattle making too much flesh. Very few cases of glanders and farcy, but very many cases of affections of both respiratory and digestive organs in the horse. No diseases particularly prevalent among sheep or pigs.

**CHARLES MARSHALL**, London.—Nothing particular to report, had two cases of glanders in the horse.

**THOMAS SANGSTER**, London.—Much glanders and farcy, chiefly in cab stocks. Both pleuro-pneumonia and foot-and-mouth disease very prevalent in London cow-sheds, attributed to infection and contagion. Affections of respiratory organs prevalent among horses.

**ANTHONY STAINTON**, Holloway, London.—Glanders and farcy not very prevalent. Pleuro-pneumonia common among cowkeepers' stock, "attributed to the buying in of stock from the markets, bringing the disease with them." A few cases of foot-and-mouth disease, and three cases of parturient fever in cattle. Very few affections of digestive organs among horses, but very many of respiratory organs, and one case of purpura hæmorrhagica supervening on a case of strangles. Among pigs, the foot-and-mouth disease.

**WM. WIGGINS**, London.—Influenza very common among dealers' horses, to some extent also inflammation of the lungs, and various affections of the digestive organs.

**EDWARD F. WILKINSON**.—The usual run of diseases among horses generally. Considerable loss of cab and omnibus horses from overwork, farcy, and other causes, during the great Exhibition.

**SAMUEL AND HENRY WITHERS**, London.—Chiefly bronchial affections among horses, yielding to simple treatment.

**NORFOLK**.—**EDMUND BARKER**, Horsham, St Faith's.—Pleuro-pneumonia in cattle not so prevalent as in former years; but the foot-and-mouth disease very prevalent about the latter part of last year. Attributed "to drift." Several cases of red water in cows about ten days after calving. Influenza has prevailed more generally among horses.

**WILLIAM ELLIS**, Hempnall.—Less pleuro-pneumonia in cattle than for several years past. Foot-and-mouth disease, in a very severe form, very prevalent; "some cattle have died from it." More than the average number of cases of red water and of black quarter, and many cases of parturient fever during the summer and autumn. Coughs, accompanied with copious discharge from the nostrils, have been very



common among horses. Other diseases much as usual. Very little disease of any kind among either sheep or pigs.

Mr BARKER mentions "one or two cases of violent inflammation of the hand and arm, accompanied with great constitutional derangement," as occurring in man from handling animals suffering with foot-and-mouth disease, in consequence of having a fresh wound on the hand.

HENRY EMMS, Foulsham.—Pleuro-pneumonia was prevalent during the spring and autumn. Foot-and-mouth disease very prevalent all through the year, attributable mainly to contagion. Black quarter rather more than usual, and two or three isolated cases of splenic apoplexy in fat bullocks. Parturient fever and red water less than usual. Diarrhoea and dysentery has prevailed among lambs during the summer, and on some farms severe losses from abortion during the last quarter, and of ewes from parturient apoplexy. A few deaths in pigs from hydrothorax. Among horses more cases than usual of affections of the respiratory organs during last spring and fore part of summer. "I have known two or three cases of persons suffering from a disease resembling foot-and-mouth disease, and from swelling of the hand and arm, from the saliva of diseased animals coming in contact with an abrasion or cut."

JOHN HAMMOND, Bale, Thetford.—Pleuro-pneumonia not quite so prevalent this year as previously. Foot-and-mouth disease has prevailed to a great extent, attributed generally to contagion. Black quarter, red water, and parturient fever frequent; the latter disease often fatal. Great losses in sheep from enteritis, and in ewes from abortion, hysteritis, &c. Pigs healthy. Enteritis in the horse very frequent.

WILLIAM SMITH, Norwich.—Pleuro-pneumonia not so prevalent; the foot-and-mouth very much so; "few escape after coming into the stock market here." Parturient apoplexy very prevalent and very fatal. Among horses, no unusual amount of disease.

JAMES WRIGHT, Burnham Overy.—Pleuro-pneumonia common. A great many cases of foot-and-mouth disease, "brought in by bullocks from the fairs." Parturient fever very prevalent. A few cases of glossanthrax among cattle, also red water to some extent. A great many sheep have died from affections of the digestive organs, and many pigs from inflammation of the stomach. Among horses, many cases of farcy, also of pneumonia, and "never had more cases of influenza, in all its forms, than during last year." Have seen a great many dogs die from eating diseased meat.

**NORTHAMPTON.**—BENJAMIN B. ARIS, Wellingborough.—The past year has in this neighbourhood been a very healthy one, more so than has been the case for ten or twelve years. Since the beginning of January, 1863, we have had a good deal of influenza in a mild form among horses. A few isolated cases of pleuro-pneumonia in cattle, and very many cases of foot-and-mouth disease, but not so many as last year, both of which may be attributed to contagion or affection.

R. MACKINDER, Peterborough.—Pleuro-pneumonia and the foot-and-mouth disease, prevalent some time past, due to “contagion only.” Black-quarter in cattle is always prevalent in the spring, and Mr Mackinder trusts to low diet as a preventative. Splenic apoplexy is extremely troublesome in the district, and the same means are adopted for its prevention as for black quarter. Red water in cattle is only seen in one place in the district, viz., at Milton Park.

Horses have been healthy, but affections of the respiratory organs prevailed principally.

Recently some pigs died from eating the spleen of an ox that had died from splenic apoplexy, and thirteen pigs having eaten the offal of a diseased ox, “suffered severely, some died and others were slaughtered, *and all were sent to London.*”

**NORTHUMBERLAND.**—WILLIAM METCALFE BOAG, Morpeth.—“Pleuro-pneumonia in cattle has prevailed to a partial extent in the neighbourhood, but has been severe on some farms; the foot-and-mouth disease in cattle, sheep, and pigs, I have never known so general. Of the contagious nature of pleuro-pneumonia and foot-and-mouth disease I have no doubt.” A number of cases of parturient fever during last year, black quarter to a partial extent, also filaria in young cattle. Sheep-rot has prevailed to a great extent, causing heavy loss. Among pigs, pneumonia, also indigestion with cerebral complications. Among horses, affections of the respiratory organs, especially influenza, indigestion, and colic, have been the most common complaints.

JOHN STEEL, Belford.—Pleuro-pneumonia and foot-and-mouth disease have been very prevalent. “All the cases of pleuro-pneumonia and foot-and-mouth disease that have occurred in this district since I commenced practice here, are attributed to the mixture of stocks in market.” Affections of the digestive organs have been most common in horses.

**NOTTINGHAMSHIRE.**—H. NAYLOR, Worksop.—Two or three cases of pleuro-pneumonia in cattle, and several of foot-and-mouth disease. “They are to be attributed to contagion, as in most of the cases that have come under my notice the cattle have come out of the dealer’s hands.” Many cases of parturient fever, particularly in spring; an occasional case of black quarter, the usual amount of red water, and a few cases of glossanthrax every year. The most prevalent disease amongst sheep stock was the autumnal diarrhoea affecting lambs, carrying off great numbers—many which appeared to rally for a time have died during the winter. The foot-and-mouth disease has been prevalent among pigs. Among horses, more cases of affections of the chest, but fewer of affections of the bowels, owing to the plentiful supply of hay, and consequent diminished use of straw as fodder.

SAMUEL REVELL, Halam, Southwell.—Among cattle pleuro-pneumonia prevails to a great extent, attributable to contagion. Foot-and-mouth disease is common among cattle, and more especially so among



Southdown sheep. Black quarter prevails to a great extent among young stock, also parturient fever in cows which are heavy milkers. Odd cases of splenic apoplexy, and red water, and glossanthrax occasionally in the summer months. Congestion of the lungs has been common in sheep and pigs, and in the latter animal measles also. Affections of the respiratory organs have occurred in the horse to a great extent, also indigestion among cart-horses. Skin diseases have been common both in horses and cattle.

F. TALBOT SHARP, Wheeler Gate, Nottingham. — During 1862, both pleuro-pneumonia and the foot-and-mouth disease were very prevalent, and due “generally to infection from animals imported.” Mr Sharp traced these diseases to three farms, on which they had been carried by one Ayrshire cow for each, purchased from a drove. No important enzootic disorders.

In horses diseases of the respiratory organs were especially prevalent, and a peculiar skin affection, characterized by excoriations under arms and thighs, desquamation on the inner side of legs, severe cracked heels without grease, swelled legs, derangement of the urinary and digestive organs, &c. Mr Sharp has furnished us with interesting particulars of this disease, and specially notices the tendency to depilation, and the occasional severity of febrile symptoms. In answer to special inquiries as to the cause of the disease, Mr Sharp says that he has only seen it in clipped or singed horses, and no others have been affected. He attributes such severe results, however to peculiarities of the season.

FRANCIS TALBOT, Whatton. — Glanders and farcy in horses occasionally, and sometimes hydrophobia in the dog. Pleuro-pneumonia in cattle frequent, and the foot-and-mouth disease very common in cattle, sheep, and pigs. Black quarter very frequent in young cattle. “One farmer has just lost twelve animals by splenic apoplexy, which were all well at six o’clock in the morning, and died before eight o’clock in the evening.” Red water is very prevalent in the neighbourhood of Tuxford. Inflammation of the lungs has been the principal disease amongst sheep and pigs. Affections of the respiratory and digestive organs have both been very general among horses.

OXFORD. — EDWARD MELLETT, Henley-on-Thames. — Foot-and-mouth disease pretty general; pleuro-pneumonia in cattle only to a small extent, attributed to contagion and atmospheric changes, mostly arising after purchasing stock from some fair or cattle market. Parturient fever has been rather prevalent during the hot summer months, and very fatal. Foot-rot has occurred in sheep; nothing particular in pigs. Among horses influenza and mild forms of respiratory affections; affections of digestive organs not so numerous as usual.

SHROPSHIRE. — CHARLES DAYUS, Longnor. — Fewer cases of pleuro-pneumonia than for the last six years, but the foot-and-mouth disease very prevalent, scarcely a herd escaping; in general, the cases are of a mild nature. Neither black quarter nor red water so prevalent as usual; of splenic apoplexy more cases than common.

“Several sheep died during the latter part of the summer and autumn from epizootic diarrhoea, the principal post-mortem appearance being a highly inflamed state of the abomasum or fourth stomach. Foot-rot has prevailed in nearly every flock. The mortality from ‘rot’ has been very great during the winter, 60 to 70 per cent. of deaths having occurred, and many now continue to die.”

Many deaths from affections of the digestive organs among horses; affections of the respiratory organs are more numerous this spring than during the whole of last year. Blood diseases have not been common.

JAMES B. JONES, Ludlow.—Many cases of pleuro-pneumonia, foot-and-mouth disease, black quarter, red water, parturient fever; a few cases of splenic apoplexy, and one or two of glossanthrax, have occurred in cattle. Sheep and pigs have suffered chiefly from chest affections. Affections of the respiratory and digestive organs in the horse have been common; few cases of glanders, farcy, or blood diseases.

WILLIAM LITT, Shrewsbury.—Pleuro-pneumonia and the foot-and-mouth disease prevailed very extensively in 1862, and were due “always to infection.” Red water in cattle and parturition fever also occurred to a great extent. Black quarter occurred, as usual, in an enzootic form. Glossanthrax, or blain, is not uncommon in some districts in Shropshire.

In horses affections of the respiratory organs were especially prevalent, and diseases of the digestive organs, as usual, common. At particular seasons influenza, occasionally assuming a malignant character, is very prevalent. Anasarca in yearling and two-year-old colts is a very common and fatal disease here.

Referring to cattle diseases, Mr Litt says:—“There is nothing that I am aware of peculiar to this particular district as regards the type or prevalence of disease in the lower animals. Since I have resided in Shrewsbury, I have seen much more of pleuro-pneumonia than in the more retired and isolated district where I previously lived. The reason is doubtless to be found in the fact, that here there is a more frequent buying and selling of strange cattle. It is the rule with many owners of stock, immediately on the appearance of the disease, to send all the apparently healthy cattle at once into the market. Until something is done to remedy this evil, there can be no such thing as getting rid of pleuro-pneumonia.”

WM. ANDREW CARTWRIGHT, Whitchurch.—Pleuro-pneumonia in cattle and the foot-and-mouth disease prevailed in 1862, and due to “contagion.” In some instances it is difficult to assign a cause. Parturition fever occurred occasionally, and a few cases of black quarter. Glossanthrax occurs at times in the district. Horses have been healthy, and no unusual disease has been witnessed amongst them.

SOMERSETSHIRE.—THOMAS D. BROAD, Bath.—Numerous cases of foot-and-mouth disease, but few cases of black quarter or parturient fever. Among sheep and pigs, rot, and foot disease have prevailed



principally. Affections of the respiratory and digestive organs very common among horses; has had six cases of glanders and farcy within the last six months.

CHARLES SYMES, Wincanton.—Several cases of pleuro-pneumonia, hundreds of foot-and-mouth disease, many of black quarter, and several of parturient fever and red water. Affections of respiratory organs common among horses.

**STAFFORDSHIRE**.—W. P. TOLL, Litchfield.—A few cases of pleuro-pneumonia, black quarter, parturient fever, &c., in cattle; numerous cases of foot-and-mouth disease; affections of the respiratory organs prevalent among horses.

JOHN CARLESS, Stafford.—Pleuro-pneumonia has not prevailed to so great an extent as it has done in years past, but it has proved fatal to at least half the animals that have been attacked. The foot-and-mouth disease has prevailed to a much greater extent than usual, and in a few instances it has proved fatal, though many recover without any medical treatment. The usual amount of black quarter occurred, and was fatal in every instance; parturient apoplexy happens frequently, and terminates fatally in the majority of instances; and two cases of splenic apoplexy have come under notice. Sheep have been affected with 'rot,' in some few instances also with diarrhoea, and with foot-rot to a great extent. Pigs have been generally healthy. Among horses, affections of the respiratory organs have prevailed to some extent, affections of the digestive organs also; and there had been a few cases of purpura hæmorrhagica, but horses have been as healthy in this locality as I ever knew them to be.

**SUFFOLK**.—CHARLES T. SHORTEN, Ipswich.—Pleuro-pneumonia has not prevailed to a very serious extent of late years; foot-and-mouth disease to a considerable extent during part of last year—their spread due to contagion. Parturient fever occurs rather frequently. Among horses, affections of the digestive organs most frequently met with, especially among farm horses.

**SURREY**.—MR W. T. CROSS, Battersea, reports a number of cases of pleuro-pneumonia in cattle, and that nearly all the cattle-sheds in Chelsea and Battersea have been affected by the foot-and-mouth disease; a few have been killed or died. They are attributed "to contagion," resulting from overcrowding, and the improper introduction of fresh animals into stalls vacated by diseased ones. "Among horses, pneumonia has been very prevalent, and also skin diseases partaking generally of the character of eczema."

**SUSSEX**.—WM. H. CROWHURST, Peasmarsh.—Both pleuro-pneumonia and foot-and-mouth disease prevalent, "imported by foreign beasts." Red water in cattle frequent. "Chronic diarrhoea in cattle (principally in the Sussex stock) is very prevalent and fatal." Distoma hepaticum in sheep and eczema in pigs have been common during the last year. Influenza and affections of the digestive organs frequent among horses.

**WARWICKSHIRE**.—WILLIAM A. PACKWOOD, Coventry.—Few

cases of pleuro-pneumonia in cattle, but many of the foot-and-mouth disease; few cases of either black quarter or parturient fever. Affections of digestive organs, caused by bad provender, common among horses.

M. TAILBY, Birmingham.—Glanders and farcy in horses of rare occurrence. Pleuro-pneumonia in cattle has been very prevalent during the past year. Scarcely an animal could be purchased in our markets that was not the subject of foot-and-mouth disease, some of the cases being of the severest character. Some few cases of parturient apoplexy have occurred in my practice. Immense numbers of pigs of all ages, &c., have been the subject of fits, they have also suffered considerably from eczema epizootica. Among horses, affections of the digestive organs, as usual, numerous. Affections of the respiratory organs very prevalent.

“I heard from a butcher, that when foot-and-mouth disease was very prevalent some years ago, he had a very bad broken-out mouth and lips, which he supposed at the time arose from putting the knife in his mouth while slaughtering, &c.”

JOHN TOMBS, Stratford-on-Avon.—A few isolated cases of pleuro-pneumonia have occurred, but none of the foot-and-mouth disease; a few cases of black quarter and parturient fever in cattle, also several of splenic apoplexy. Last autumn lambs were affected with schirrous lungs and diarrhoea, which ended fatally in many cases; no particular disease affected pigs. Among horses, bronchial affections, influenza, and strangles have prevailed to a great extent. Affections of the digestive organs have been less general than usual. Purpura hæmorrhagica, following influenza and strangles, has occurred in a few instances.

“As to the flesh of diseased animals having proved injurious as human beings, I can say little publicly (although I know it does), to cattle and sheep in the last stage of disease are slaughtered and sent from this vicinity to the ‘black country,’ particularly to Birmingham, for sale.”

WILTSHIRE.—JOHN COLEMAN, Salisbury.—No case of pure pleuro-pneumonia in cattle, but many of bronchitis; foot-and-mouth disease has been prevalent, but in a mild form; have had a few cases of parturient fever and of red water. Foot rot and inflammation of the uterus after lambing have prevailed principally among sheep. A few cases of glanders and farcy have occurred in the horse during the last twelve months; other diseases as usual.

“I am of opinion that the past year has been generally healthy, with less of epidemic disease than we usually find.”

THOMAS AUBREY, Salisbury.—Pleuro-pneumonia has occurred to a very limited extent, but the foot-and-mouth disease has been very prevalent. They were “introduced by infected animals purchased in markets and fairs.” Parturient fever in cows has been somewhat prevalent. The foot-and-mouth disease has prevailed principally among sheep and pigs. Amongst horses affections of the respiratory



organs were more prevalent last summer than during the present winter. A few cases of purpura hæmorrhagica have occurred, but affections of the digestive organs have been fewer than usual.

JESSE O. VINCENT, Swindon.—Pleuro-pneumonia in cattle has been prevalent on many farms, and in consequence many animals have been killed, and a few have died. The foot-and-mouth disease was very common last autumn, but there is less at present, and last autumn a few cases of cow-pox occurred. Quarter-ill is common on many farms, affecting young cattle, and generally proving fatal. Parturition fever has been very prevalent, and also the 'husk' in calves. Among horses "cases of influenza have been rather frequent, in some instances assuming the character of pneumonia, and as the horse recovers he becomes lame in the legs." Both colic and constipation are of frequent occurrence.

[DEVIZES.—I had a favourable opportunity last year of ascertaining the extent to which live stock suffers from disease in this county, and found that the most serious animal losses are sustained by enzootic diseases of sheep, such as blood disease in lambs and heaving pains in ewes.

Contagious diseases chiefly prevail on the track of land which is covered by drift-ways connecting Bristol with London. Epizootic aphtha broke out amongst cattle and sheep. I witnessed outbreaks of scab, and the well-known attacks of small-pox, in sheep. It occurred to me, that so long as the downs of Wiltshire are traversed by animals affected with disease, farmers must be liable to severe losses; and we know that in the Colonies this would not be permitted, and if sheep affected with scab or other contagious disease were seen, they would be at once treated or destroyed.—J. G.]

**WORCESTERSHIRE.**—FRANCIS BLAKEWAY, Stourbridge.—One or two isolated cases of pleuro-pneumonia, and a great many of the foot-and-mouth disease in cattle. "In every case that has come under my notice, it has been traceable to infection. Have had a few cases of parturient fever. Rot and attacks on the lungs have prevailed principally among sheep and pigs. Affections of the respiratory organs in horse have not been so common as in some years, but affections of the digestive organs have been many. On the whole, it has been a healthy year for stock in my district."

Mr FINLAY DUN, Weston Park, Shipton-on-Stour, sends the following interesting report:—"Pleuro-pneumonia in cattle has occurred in various herds in Warwickshire and the adjoining counties, and generally appeared shortly after fresh purchases had been introduced among the stock, and has destroyed probably 10 or 12 per cent. of the numbers affected. It is not, however, now so prevalent as it was two months ago.

"The foot-and-mouth disease in cattle and sheep (epizootic aphtha) has for twelve months been so common throughout the midland counties of England, that it has been quite unsafe to introduce amongst sound stock cattle purchased at Warwick, Banbury, North-

ampton, Worcester, Gloucester, or any other of the larger fairs. I never buy without placing my fresh purchases in quarantine for at least three weeks. Amongst dairy farmers the disease last summer caused great losses, the udders being much involved, the cows never recovering their milking value, and frequently having one or two quarters of their bag permanently injured. From neglect or bad treatment, a few fatal cases occurred. Both are to be attributed to contagion.

“Black quarter or quarter-ill in cattle is seldom so common throughout the winter months as in autumn and spring, but at no season is it so prevalent as it was a few years ago. This is mainly to be ascribed to more careful, regular management, keeping the young stock in a steadily improving state, preventing their at any time falling off in condition, and supplying a daily allowance of linseed cake. Several observant breeders in this district consider that Herefords are more subject to black quarter than shorthorns. Many disapprove of setoning as a preventive, and some give their calves and young cattle, whilst on winter fare, an occasional dose of salts, probably one in three weeks.

“Red water in cattle is not known in this neighbourhood.

“Among horses, since the beginning of December, colds and so-called influenza have been very prevalent, many farmers having the whole of their horses laid up in succession, and the disease spreading as if contagious. Fatal cases terminating in congestion of the lungs have been frequent, especially where the animals were kept at work or worked before they were fit for it.

“One gentleman lost three out of sixteen affected.

“Strangles has been unusually common amongst young horses, protracted and severe cases being numerous. It is a curious fact, that concurrently with strangles in horses and foot-and-mouth disease in cattle, measles and scarlet fever should at present be so prevalent amongst children. There would seem to be some special peculiarity in the season favourable to the development of these eruptive fevers.

“The foot-and-mouth disease is not considered communicable to the human subject, and I have only seen two cases which would induce me to doubt the correctness of this belief. Both occurred last summer. One in a boy of ten, the other in his father, a man of sixty. Both were much amongst cows affected by the complaint, and drank the milk of diseased cows. Vesicles appeared along the roof of the mouth and on the tongue, exactly resembling those seen amongst cattle. There was great discomfort and difficulty in eating, much thirst, and febrile symptoms. Neither had any treatment beyond a saline aperient, and the local use of borax and honey.

WILLIAM A. HARBER, Kidderminster.—Pleuro-pneumonia has been frequent of late, also the foot-and-mouth disease till now. Parturient fever has been very frequent and very fatal. A few cases of red and black water have occurred. Among sheep stock a congestive state of lungs in lambing ewes, and subsequent hepatization has been



prevalent and mostly fatal. Catarrh and influenza are chiefly noticeable.

**WILLIAM FURNIVALL, Worcester.**—Contagious diseases amongst cattle have been very prevalent, one farmer alone losing quite L.300 worth of stock. Pleuro-pneumonia and the foot-and-mouth disease are recognised by Mr Furnivall as due “to infection and contagion. Sheep and pigs have suffered from epizootic aphtha.

Mr Furnivall reports a case in which the flesh of a diseased animal seriously affected an elderly man for some days. The butcher who sold the beast was summoned, and fined 16s. and costs in Worcester.

**YORKSHIRE.**—**JOB COOPER, Market Weighton.**—Pleuro-pneumonia in cattle has prevailed to a very slight extent. The foot-and-mouth disease has been very prevalent in both cattle and sheep attributed to contagion. Other diseases of cattle have prevailed to a slight extent only. In sheep stock, foot-and-mouth disease and abortion among ewes to a slight extent. Affections of the respiratory organs have been rather numerous among horses.

“All kinds of stock have been healthy during the last year, more so than I have ever known them to be. I think mange has been the most prevalent complaint.”

**RICHARD CORTIS, Shipton, near York.**—We are never fairly free from pleuro-pneumonia in cattle. It prevails more particularly amongst the Irish beasts, great numbers of which are grazed here; the foot-and-mouth disease, also, is more than usually prevalent. Glossanthrax frequently occurs, but there has been less than the ordinary amount of black quarter and red water, while the cases of parturient fever have been much as usual. Among horses, strangles and influenza have been more prevalent than common. Affections of the digestive organs have been very prevalent amongst farmers' horses, from the wet harvest fodder being in bad condition.

**JAMES COULSON, Stokesley.**—There has been a considerable increase in pleuro-pneumonia over the last three years, and I am quite sure very few beasts in this district have escaped the foot-and-mouth disease. These affections are to be attributed to contagion from Irish beasts bought at different fairs and markets, and brought into this district suffering from some stage of these diseases. There has been considerably below the average amount of black quarter, which I consider due to prophylactic measures. There has been less than the usual amount of parturient fever, also, while we have had about the general average of cases of red water. Sheep have been very subject to rot, foot-rot, and sturdy; pigs to diseases of the brain and digestive organs.

Affections of the respiratory organs among horses have been very numerous, and have prevailed in an epizootic form in many parts of Yorkshire. Disorders of the digestive organs have been comparatively unfrequent, which I attribute to a better system of feeding and stable management.

Mr Coulson adds:—I have known two human beings affected with *eczema epizootica*. I should not like positively to assert I have known the flesh of diseased animals prove injurious to human beings, but, at the same time, I am of opinion such cases are of frequent occurrence, and only need strict inquiry to bring them to light.

“Pleuro-pneumonia is very much on the increase in this district, which causes the markets to be filled with an immense amount of diseased meat, and as there are very few inspectors appointed, the greater part of it is sold at a low price to the poorer classes for food, which I consider a disgrace to the nineteenth century and the Government.”

BENJAMIN CARTLEDGE, Sheffield.—Horses were not subject to any unusual diseases in 1862. Glanders always prevails to a certain extent, and in great measure owing to inattention to the slaughter of diseased animals. Affections of the respiratory organs were more common amongst horses than those of the digestive apparatus.

EDWARD COLEMAN DRAY, Leeds.—Pleuro-pneumonia in cattle was very destructive in 1862. Glanders in horses not frequent. Amongst horses there have been numerous cases of disease of the respiratory organs, attended with low fever and great prostration. Affections of the digestive organs were below an average in 1862.

D. C. EMMOTT, Keighley.—Has had no cases of pleuro-pneumonia during the past twelve months. The foot-and-mouth disease prevailed to some extent in the winter and spring of 1862, and again during the past winter; at the present time, it is common, but occurring chiefly among cattle newly brought over from Ireland. “I have not been able to trace the causes of these disorders to anything beyond contagion.” A few cases of parturient fever occurred during the past year—otherwise, cattle stock has been very healthy. “The principal diseases among sheep have been the ‘rot’ and ‘foot-rot.’ The rot has, and is committing sad havoc in many flocks.” For the past three months, catarrh and influenza has prevailed to some extent in cart horses, and in the autumn some severe cases of colic and enteritis occurred from improper feeding and overwork.

JAMES FREEMAN, Hull.—The lung disease and epizootic aphtha occurred to a considerable extent in 1862. “Pleuro-pneumonia breaks out mostly amongst Irish cattle when they begin to fatten. The foot-and-mouth disease has raged in the dairies about Hull. Cows bought at fairs and markets have been seized with it when brought home.” Black quarter seems on the decline in the district, and parturition fever occurred as usual in the past year. Glossanthrax occurs occasionally in the district. In horses diseases of the organs of respiration have especially prevailed. Mr Freeman reports having had a case or two of scarlatina during 1862.

JOSEPH FREEMAN, Keyingham, near Hull.—Pleuro-pneumonia in cattle prevails to a great extent, and also the foot-and-mouth disease, many of the cattle being taken with it after coming home from market. Many cases of parturient apoplexy have occurred, but never



knew so few cases of black quarter. Have had a few cases of measles in pigs. Horses healthy, except that mange prevails among them to an extent I never knew before.

WILLIAM HICK, Fulford.—Cattle suffered severely from pleuro-pneumonia and the foot-and-mouth disease in 1862. This occurred “generally from contagion.” Parturitive fever was of a very fatal character whenever it occurred. Mr Hick only saw one case of black quarter. He reports the occurrence of many cases of disease of the organs of respiration and digestion; and he witnessed two cases of scarlatina, and one of purpura hæmorrhagica.

H. L. HOLT, Northallerton.—Many cases of the lung disease were witnessed, and epizootic aphtha never was more prevalent. Next in frequency came black quarter, then dropping after calving, and a few cases of red water were observed in cattle, as also a smaller number of attacks of splenic apoplexy. Glossanthrax is occasionally witnessed in the district.

Diseases of the digestive organs in horses exceeded in proportion those of the organs of respiration; and amongst the somewhat unusual maladies were two cases of glanders, a great many cases of ringworm and of other cutaneous affections.

Sheep suffered from splenic apoplexy, rot, and foot-rot, and losses were sustained amongst pigs from congestion and inflammation of the lungs.

Mr Holt has witnessed inflammation of the mouth and eruptions in human beings due to using the milk of animals affected with the foot-and-mouth disease.

THOMAS HORNE, Barnsley.—Pleuro-pneumonia in cattle has prevailed to a great extent, and nearly every beast in this neighbourhood has had the foot-and-mouth disease. “In my opinion they arise from contagion.” Black quarter, parturient fever, and red water not very prevalent—splenic apoplexy more so. Foot rot has been common among sheep. Horses have been tolerably healthy, but the year before last cases of purpura hæmorrhagica were frequent.

JOHN D. PEECH, Wentworth, Rotherham.—A few isolated cases of pleuro-pneumonia; the foot-and-mouth disease has been very prevalent, chiefly amongst lean cattle and milch cows, the prevailing cause of which is contagion. There have been a few cases of black quarter. Epizootic aphtha chiefly prevailed among sheep; I have not heard of it amongst pigs in this neighbourhood, although I have previously seen them affected by it.

Among horses, in the early part of 1862, affections of the respiratory organs were exceedingly prevalent in some localities, taking a severe form, and implicating the hepatic organs. Affections of the digestive organs not so frequent as usual.

“During the past year, stock generally has been tolerably healthy in this neighbourhood, if we except eczema epizootica among ruminants, and so little seems to be thought of it now, that numbers of cases occur in which the veterinary surgeon is never consulted. In

milch cows it seems to have affected the mammary glands more than in previous outbreaks of this malady."

THOMAS PRATT, Masham.—Pleuro-pneumonia has prevailed among a few herds of newly-bought cattle, but very few that are reared among us suffer from it. The foot-and-mouth disease has prevailed to a dreadful extent, so much so, that scarcely a cow within ten miles of Masham has escaped; in fact, I believe all in North Yorkshire have suffered. I consider them generally the result of contagion. Parturient fever is very common during summer, especially in aged cows, and is very fatal. We generally have a good deal of red water during autumn, both in bullocks and milch cows; it does not often prove fatal, unless the cases are not taken in time. Black quarter is of frequent occurrence; even in cold, backwards seasons we lose a few. Both rot and scab have made sad havoc among sheep, likewise epizootic aphtha has not failed to annoy thousands. I have heard of pigs suffering likewise from the last complaint, and a few from chest affections. Diseases of the respiratory organs have been very prevalent among horses. Last spring, typhoid pneumonia, as some term it, was very common; this winter, pleurisy has been equally so. Indigestion, colic, constipation, &c., are always prevalent during winter among farm horses, and last midsummer we had a good deal of enteritis.

"I had an eruption upon my hands and feet last summer, though of short duration, which I traced to the drinking of milk sold by a cow-man who had cows bad at the time of epizootic aphtha. I have heard of others suffering in the same way, and much worse than I did."

[During my travels in 1862, I had occasion to notice that Yorkshire was probably one of the counties most subject to outbreaks of contagious diseases, owing to the many Irish animals which enter it through the port of Liverpool, and a large number of foreign animals through the port of Hull. Yorkshire has, however, its full share of enzootic disorders, and it is a remarkable fact that a very large number of cows are carried off annually by the fatal apoplexy which succeeds calving. The occurrence of anthracoid affections, such as black quarter and glossanthrax, is noticed more generally over the county than in many parts of England.—J. G.]

Mr JOHN STEVENSON, Whitby, reports several cases of pleuro-pneumonia in cattle, and the great prevalence of the foot-and-mouth disease among them. "In most cases they have prevailed amongst cattle imported into the district, or cattle directly infected by them. Black quarter not more prevalent than in other years, but many losses occur through this disease annually. Red water is very prevalent, and in excess over other years, more fatal in its results, and occurring on farms where it was never known before. Parturient fever is decidedly under the average. Foot rot and scab have principally prevailed among sheep, and inflammation of the



lungs among pigs. Distemper and influenza very prevalent among horses, many of the cases being very severe; other affections not above the average.

MATTHEW STONE, Wath-upon-Dearne, Rotherham.—Not nearly so many cases of pleuro-pneumonia as occurred a few years ago. The foot-and-mouth disease has prevailed to a very considerable extent, a great number of cases having occurred during last summer, attributable in a great extent to the introduction of fresh cattle from the different markets. The farmers in this district have sustained very severe losses from black quarter within the last two or three years, many cases occurring in the month of June. A considerable number of cases of parturient fever occur annually in this district, but red water is not by any means prevalent. Amongst sheep and pigs have prevailed principally the foot-and-mouth disease and pneumonia. Affections of the respiratory organs in the horse have been numerous, assuming a low typhoid character, often terminating fatally. Affections of the digestive organs are not so prevalent of late years, owners exercising more care, nor allowing them so great a proportion of stimulating food, as beans, &c.

"I am of opinion that the health of stock is much better, of late years, consequent upon improved ventilation, extended drainage, and the greater attention paid to feeding, &c."

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*Exposition of Views on commonly occurring Morbid Conditions of Horses' Feet.* By Professor GAMGEE, Sen., New Veterinary College, Edinburgh.

THE subjects to which my last paper, published in the April number of this *Review* were devoted, embrace a wider field of research than was pretended to be there and then fully gone into. Little more than the mapping out of new ground for observation could be aimed at, where so much must necessarily be done, to accomplish which co-operation and time are required. The work to be carried out involves the removal of some wrong notions and the substitution of new doctrines founded on correct knowledge, regarding the economy of the foot of the horse.

The normal condition of the horse, the perfect state of the component structures of his foot and limb, formed the main points contemplated and treated on in my last paper; morbid states of the organ and their inducing causes, will additionally receive my best care with a view to their exposition in this.

Such intimate connection exists between physiology and pathology, viz., between healthy and disordered functions, that the latter can only be rightly studied through keeping the normal standard of structures before our minds, and to a great extent by submitting these to our sight and touch. Such is particularly the case with regard

to our present subject, where disease implies principally annihilation or perversion of functions. To discriminate between healthy and disordered functions is what we are required to do.

#### CONTRACTION

is the word which I shall take for my theme, as it is adopted to designate an assumed condition of the horse's foot.

If it be true, as I believe it is, that language constitutes the key to the sciences, it must be equally evident that language wrongly used tends to convey relatively false notions; and that such is the case regarding the application of the word contraction, in its common acceptation, in speaking and writing about horses' feet, it will not be difficult to prove. The word 'contraction' is used to describe a narrow or small foot of the horse.

As I have already stated, and the proposition is as clearly demonstrable as any law in physiology, that the foot does not expand or widen out, as it was supposed to do under exertion, so I am also prepared to show with equal positiveness that the organ neither contracts as is so emphatically insisted on by writers, and assumed as proven by readers. I address these remarks, firstly, to those who, like myself in past years, became deeply imbued with the hypothesis that there is a constant tendency in the horse's foot to contract, and that something like a war of contention between nature and art subsisted, so that at every movement, as constantly taught, there is an alternate widening and narrowing of the foot. With these assumed notions deeply implanted, as they undoubtedly are, it must necessarily take time to persuade men to entertain opposite views.

On the other hand, addressing myself to students and readers not committed to any special doctrine, and whose minds are directed in search of knowledge of the horse's foot, I hope not to fail in affording direct aid; and if I should be fortunate enough to persuade old friends to reconsider the matter, the ends for which I am writing will be in a fair way of accomplishment.

So continually and vaguely applied is the word 'contraction' in speaking and writing about horses' feet, that but for having been in the dilemma myself, it would be impossible to conceive the notions entertained regarding it.

We from time to time hear much, earnestly uttered, about contraction of horses' feet, from the witness-box at our courts, to the shoeing-forge, and also the stable-yard; the words 'contraction' and 'heels' are usually employed in connection, so used they seem to express an idea that the tendency to spontaneous contraction is constantly present.

I conceive it to be expedient to test the value of the word 'contraction,' in its relation to the foot of the horse, before extending my views on some diseased states of the organ, not restricting my inquiries into the influence the hypothesis exerts by complicating the



business of shoeing, and knowing that the whole management of our horses, beginning with the foal to that of the oldest horse, is made to work in opposition to the laws of Nature, through the groundless ideas about this matter.

Nothing has tended so much to damage the most valuable of the breeds of English horses, rendering lasting animals scarce, and consequently costly, as the way their feet are managed, through the prevailing notions, alike inconsistent with fact and reason, regarding contraction. An imaginary evil has been created, and an indefinite number of equally imaginary measures, to subdue a myth, and in those measures lie the real evils.

I repeat that the rebounding spring in the horse's foot in action, is unattended with expansion, and I assert that there is no tendency in any part of the foot to contract.

Horses' feet imperfectly developed through want of right care, may be small, narrow, and upright, or broad, flat, and shallow, depending on the causes in operation, but no such influences as the notion of contraction conveys, are present. It is not a hair-splitting difference about a word or a mere shadow, but something real and demonstrable about which I am contending.

If we could dismiss from our minds the word 'contraction,' and all ideas of the inward pressure implied, and adopt instead, the word 'atrophy,' we should have a meaning given to almost all the deranged states of the foot of the horse, whether the cause be want of development, through perversion of natural influences, or whether it be the effect of misapplied art subsequently; atrophy, which means wasting or lack of nutrition, would indicate the true condition of the foot, and lead to inquiry after causes. There are many of the most common affections of horses' feet which have yet to be described, and which require the attention their nature demands. Atrophy is the word that clearly indicates these, whether speaking of a particular tissue, or several component parts of the same organ.

Before I bring to bear the proofs which anatomical details afford, I shall endeavour to show, by some other modes of exhibiting the subject, what does take place, dependent on different hygienic influences prevailing. It is not to the members of my profession alone that this subject must be addressed, but to breeders, owners, and managers of horses, who are required to co-operate with us in order that good effects may the more speedily result.

Where evidence abounds, it is difficult to select the facts and illustrations which are most likely to form the best foundation for argument.

In the first place, there is much which requires correcting in horse breeding, viz., in the management of young horse stock. That which is commonly set down to degeneracy in our breeds—want of stamina, and to hereditary diseases, is due to totally different causes. More and more artificial treatment, with less space and variety of ground to pasture on, forced growth, and hurrying into maturity, are amongst

the first causes of imperfectly developed feet. Keeping young horses on wet soft ground, on dung, or, in short, any other than firm well-drained land, or clean and dry paved boxes, constitutes the second series of common causes of weak feet, ill adapted for wear and trying exertion.

When young horses, treated more or less as indicated above, are put into use, they are equally unprepared to sustain their work, and the new artificial processes to which they become subjected. Hence, the art of shoeing, which is of itself a common cause of permanent injury, becomes doubly so, because it has to be applied to feet which have never become developed to anything like a normal standard of perfection.

There is a common saying in use, which tells us that in man a strong mind is only found in a sound body, and my own experience has informed me that, in horses, strong feet, wiry, well-formed limbs, and robust constitutions are generally found together; and, *vice versa*, a weak-footed horse is commonly a flat-sided, bad constituted animal.

The notion now abroad, founded on the assumption that the hoofs of horses grow and acquire form in moisture, is altogether erroneous. It may be laid down as a rule, not only that the horse requires a dry firm surface, but that every animal in creation which is endowed with hoofs, whether cloven or not, is destined to subsist on dry firm ground. It is unphilosophical to suppose that animals to which nature has given hoofs, in which case the bearing surface of the foot is always small in comparison with those animals which are destined to live on, or run over soft ground, should require *that* firm substance to be changed by uncongenial humidity, and never be allowed the comfort of a clean dry hoof.

To adduce comparisons in support of the above propositions would seem needless. We have no other animal to compare with the horse for power, speed, and size; but we may take, for illustration, the smaller animals endowed with hoofs, viz., the wild goat, the deer, and the wild boar. How compact, hard, and strong are their hoofs, and how small the space they cover on the ground compared to their enemy of prey, the wolf. The same argument holds good with other large and small animals endowed with hoofs. Concentration of strength forms the obvious feature in all. The ox, the giraffe, and every animal endowed with hoofs, require their feet to be dry as a rule, though they can endure temporary moisture exceptionally.

The above is supported by all experience, and wherever good horses are bred, it is found that the soil is firm.

Horses' feet acquire perfection under an eastern sun, when all other conditions favour, viz., freedom for exercise on sound or rocky ground surface, with the requisite food production.

Of nothing in the character of the soil is the foot of the horse so intolerant as of perpetual wet; and next to excess of humidity, a soft indefinite yielding footing is subversive of its functions, such as



dung, soft peaty land, and even drifting sand. None of these soft surface beds constitute the naturally ordained stimulants to the horse's foot, or any of its component structures.

Fantastic notions prevail about the foot of the horse performing somewhat the office of a stamp, that it should leave its impression fully marked, that the convexities of the foot should be embedded into the ground, and the concavities be filled with the soil.

The above notion has led to horses being doomed to stand for hours daily in wet clay, wet sawdust, &c., and in many cases from October to March in a wet farm-yard.

That all the above processes of treating horses are destructive to their feet, only requires time to convince readers, I shall invite them to look at the other side of the picture. I have said that all animals endowed with hoofs, and especially the horse, the ass, and the whole equine family, are ordained to exert their useful parts on dry firm land, or hard rocky surfaces. The prominent parts of the foot's surface are alone essentially required to have contact with the ground, the concave surfaces do not invite pressure, any more than does the bottom arch of man's foot require to be filled and compressed at every step, or that a dog should bear equally on the prominent balls and the concavities of his foot.

I submit, as an axiom, that the prominent points only of the plantar region of the foot are destined to bear on the ground.

The beauty observable in the foot of the horse for its many wonderful properties, consists in its compact form, concentration of power, which is due to the perfection of its arched structure, and in the way the bearing is diffused from the centre of the arch above, and expended over a broad base. If people would reflect, when rowing, under one of the arches of London Bridge, that the weight which is moving over it is borne safely, yet only let there be a flood of water to rise above the arch and cause an upward pressure, and the effect will be reversed. The horse cannot bear a snowball under his foot, nor is any padding salutary to the sole; hence the bad custom of cutting away the natural sole of his foot, and then applying a leather, felt, or gutta-percha one, and stuffing in between it and the mutilated foot a wadding of tow, tar, and grease.

The form of the foot of the horse, given by Coleman as the standard of perfection, was such as would be nearest approached in a horse bred on the flat muddy banks of a river, where nature would flatten out the foot of the animal as broad as long, to prevent him from sinking; in that case the hoof, the pedal bone, and plantar structures would all be flattened out. A horse so reared would be able to waddle along with a little less speed than a man could run. I advise breeders of horses, of all descriptions, if any thing besides mere bulk in the animal is wanted, to breed on dry ground, and let all other essentials be added. Gentleman who breed for the turf, who are not aware of these facts, will do well to observe them. If a company of breeders were to take Stockwell, with all the Touchstone

and Voltigeur mares, and place the latter, and in due time their produce, where their feet would be immersed in wet for six hours daily, they would never breed a Derby colt or an Oaks filly, however well feeding and shelter might be arranged; the condition of the feet alone, in the state supposed, would preclude the possibility of great speed, and more especially of durability under exertion. I have known good tried stallions, whose stock, produced in a generally good breeding district, were on an average very good, which, when the same horses have been transferred to a locality where their produce was reared on wet, undrained land, were found on trial to be worthless.

The late Mr Bracy Clark rendered valuable service to veterinary science when he opposed the then-established doctrine which defined the shape of the horse's hoof to be that of a cone, whilst Clark himself said that its true form was that of a cylinder.

Without committing myself to a statement, that the form of the hoof corresponds exactly to that geometrical figure, I find that Clark's description is practically correct and good, the greatest strength and capacity is presented by a cylindrical form, the arched sustaining powers are compatible with hoofs so shaped. Whereas, with the conical form, these essential conditions would be incompatible. In my anatomical description of the hoof, and on various occasions in my writings, I have stated that the sole regulates the form of the foot, and when that structure is from any cause weakened, it loses the power of supporting the pedal bone, and of keeping the wall in a normal form; hence, in breeding, a soft soil is a common cause of flat and weak feet, the arch in the sole is wanting, and the coffin bone also flattens, when the leverage forces are diminished owing to disadvantageous attachment of tendons and ligaments. Again, a wet soft footing in a farm-yard leads to wasting away, viz., to atrophy of the frog and plantar structures, in which case the soft sole may, through the same want of power to retain form, bend upwards, and so alteration of the foot becomes general in conformity, not by contraction as is said by writers, who contend "that the hoof of living horses when exposed to the atmosphere and the sun's rays, shrinks like the hoof detached after death, or like a deal board exposed to the same influences."\*

It is not through atmospheric or other natural influences with us that horses' feet suffer, but through excess of moisture, and consequent lack of natural stimulus, hence the cause of atrophy, more or less general, of the foot.

Diminished capacity in the foot is compatible with an undue widening of the whole structure at its bottom surface, and weakness, if not immediate lameness, results with such form and conditions.

The sole of a foot, when almost flat in the young horse, will, through the disadvantageous form acquired, be ill-adapted to retain

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\* See *Essay*, by Professor LA FOSSE of Toulouse, published in the *Veterinary Journal du Midi*, for May 1859, entitled "Observations on Contraction," &c.



that form, but one less favourable, viz., a convexity of sole, commonly succeeds as the effect of weakness, and incapacity to sustain its burden. In this latter condition, the foot, which in the colt was wide below and little arched, diminishes in depth and also in circumference round the coronet; and we have a shallow, wasted, weak foot, the coffin-bone of which, when examined after death (the course of procedure by which these views have been arrived at), that bone will be found in form like the hoof, its depth diminished by absorption, which takes place upon its bottom circumference and surface. Such a foot is in a state of atrophy in all its parts, from the bony structure within, to the hoof exteriorly.

The accompanying illustrations will help the reader, it is hoped, to comprehend the subject.

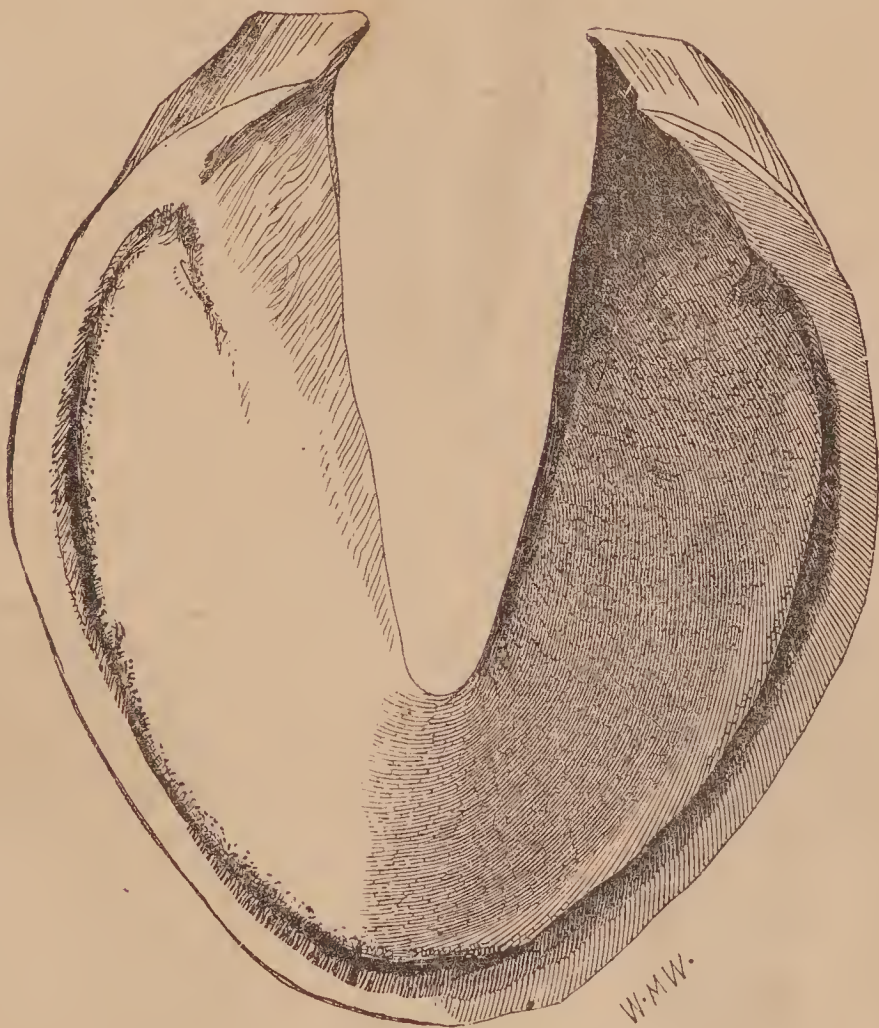


Fig. 1.

Fig. 1 represents the two chief component parts of the hoof, the wall and sole, the frog having been removed, as it always can be, by long maceration in water.

The sole is thickest at, and is strongly connected anteriorly, and in its two posterior terminations, where it is so strongly invested by the inflexions of the wall, as to be incapable of direct dislocation by any means, whilst the parts remain in their integrity, viz., not cut away or weakened. The inflected wall, which, according to prevailing notions, is called 'the bars,' constitutes for all essential purposes an inner wall, a continuation of the outer wall; these inner inflexions have no such abrupt terminations as their outer appearance at first sight indicates, or as seems to be the case by the laminated attaching inner surface; the same inflected wall forms the inner boundary of the two lateral divisions of the sole posteriorly; and

it is by these that the strength of the sole is contributed, and its arched form perfected. This inner wall diminishes from its posterior inflexion, to where the point of the frog is inserted. Posteriorly the inner wall measures in depth, in the normal foot of a horse, 15 hands and a half high; taking the measurement in a line of the fibres, it will be found 1 inch and 7-eighths to two inches. Measured in a line with the centre of the frog, the depth of the inner wall is 1 inch 1-8th, and near the point of the frog laterally, the wall forming the sole's margin will be found to be 5-8ths of an inch in depth.



Fig. 2.



Fig. 3.



Fig. 4.

Fig. 2 is the frog, which so wedges into the centre, where its point is dense, and forms the *point d'appui* to the posterior region of the same organ, and gives support to the strongly arched sole.

Fig. 3 is a representation of the sole, with the inflexions removed from the outer wall.

Fig. 4 shows the wall when unsupported by the sole, at once twisting inwards, until the two lateral extremities meet and press together.



On the four preceding figures, given for illustration, I will submit some further remarks.

When we have fully understood the economy of the hoof, as its separate parts are relatively connected, we shall know much of what is required to be learned for the successful management of horses' feet.

We need not, in this brief summary, enter on the reasons why nature made the hoof of several distinct textures of horn, differing in density and in the order of the distribution of their fibres, yet these all become the more admirable as we learn the separate office each performs, and how the whole harmonize. As we said, when speaking of the knee and hock joints, strength and functions are given which the union of two bones could not confer, so with the hoof the same remark holds good; it is the order of conformation, no less than the character of the substance, that gives the combination of properties.

I have to acknowledge, as the first incentives to inquiry into the economy of the hoof, the works of Bracy Clark and Strickland Freeman, and, looking back to where inquiry leads one, I may acknowledge help derived from the writings of men of all countries and of remote times. It is, then, no cause for exultation, that in our generation we should be able to add to the common stock of knowledge on this or any given subject; the state of our profession would furnish a most humiliating contrast to others, if the case were otherwise.

I now beg to make reference to a passage in the work of the first-mentioned author above, who stands last amongst the writers alluded to in the order of time. In describing the sole, Mr Bracy Clark says at page 91, "Nature has secured herself most remarkably in two ways from the effects which an arch of common properties would have been liable to, in becoming condensed under pressure, and forcibly resisting the load brought upon it, which would have been subversive of the leading principles in the mechanism of the hoof; the sole, therefore, is cleft to its centre, or even beyond it, by a large triangular opening formed at its posterior part, which, destroying the resistance of the arch, serves to receive first the inflected ends of the wall of the hoof, and then is closed and filled up by the insertion of the inverted arch of the frog, so that these ends of the hoof are thus tied in and secured from being forced asunder by the pressure from within being thus wedged in between the frog and the sole, and are made to serve outwardly in their places the other offices we have already noticed, and the sole, by the above chasm in its centre, being thus essentially broken, has a diminished resistance in all its parts."

The last phrase in the above passage from the work of that great observer and ingenious writer, is that on which I have to make remarks, not unimportant in this inquiry. Here, again, we see, when the mind is prepossessed by an idea, how difficult it is to reason and exclude the interference of foregone conclusions. The notion that the foot expanded, and that the sole descended when sustaining, led our late author also to exercise his ingenuity to show that such function

was provided for by the conformation. As step after step completes a journey, so it is in scientific inquiry; and if a contemporary worker had shown that the foot did not so widen, then Clark (to use a hunting phrase) would have made a cast, and the probability is, that if such had happened, any time before he had reached the age of three-score years and ten, that he would have worked out the subject to a clear point.

Taking the facts as we find them, and seeing that the foot does not widen when borne on and exerted, but just the opposite tendency prevails, we are led to see that the arch of the sole is not weakened by its posterior division; on the contrary, through it and its connection with the inflected wall, it is infinitely strengthened.

The specimens from which these illustrations were taken, detached though they be, are enough to place the whole question in a clear light, or rather to prepare the physiologist to establish beyond doubt, the leading functions of the foot, when due consideration has been given to the whole.

The hoof, let it be understood, is highly elastic. It is perhaps more than any other structure in the mechanism of the horse, that in which elasticity, or a rebounding property, may be seen. The wall embraces the organized structures like an elastic clasp, and if deprived of the sole, would constrict, or, if unconnected by such inward provision as we find it to subsist, it would bulge.

The position of the sole is such that its resisting point is against the wall, where the substance of horn is greatest at the anterior region of the hoof, and it is most intimately blended with the reflected ends of the same structure posteriorly, as has been described. The arch of sole so supported, placed under that of the pedal bone, is complete, and instead of being weakened by the division, I find that its span is lessened, and that the power of resistance is thereby increased. Regarding the movement, as I stated in my last paper, the action of the foot is not that of a bulging, nor yet of a constricting kind, but consists in the bending upwards of the whole posterior region by which the sustaining power of the sole and that of the whole hoof is augmented, when the energy and force employed in action requires such combined resources in the greatest degree.

I have yet to say a few words more on the connecting medium between the wall of the hoof and the inner structures, on which I made only a few statements, as introductory to the subject, in my last paper.

Various have been the speculative views advanced regarding the functions of the laminated attachment; on few points only are men agreed concerning these structures. I shall not now discuss the matter at length—sufficient for the present will be to show what has been the teaching, and what are the received notions, and then to state my own views on the subject.

It is generally believed that by that attachment the superincumbent weight is suspended within the hoof, and that the pedal bone con-



nected to the wall, as it is, is suspended by means of this double set of connecting plates. I have referred to experiments, barbarous enough, which were instituted to test the question, and shall pass on now, without farther notice of these.

At no time whilst investigating structures, and when presuming to interpret Nature's designs and laws on the animal economy, did I feel so deep a sense of humiliation for the slowness of my own understanding, as through not having seen at an earlier period in my life, that the functions of the lamina could be nothing like what they have been represented to be.

As has been said, the whole hoof is highly elastic, and I may add that the moveable functions of the inner structures are considerable, most exact, and intimately connected with and corresponding to the action of the hoof. Motions between structures require corresponding provision in the attaching medium, thus a close adhesion of the pedal bone, and the cartilages posteriorly with the wall, would be incompatible with the functions these structures are called on to perform. Hence the wisdom in giving that laminated connection, which admits of considerable motion in the parts, in the exact way it is required to be carried on.

When it was first said that the whole weight of the animal was suspended by means of the laminæ, and not, as is really the case, and as should have seemed the more reasonable, sustained and supported by the double arched structures; it is now matter for wonder that it should not have been seen, that of this laminated structure a large proportion is beneath every other, save the outer layers of the hoof.

That which was said suspended the weight of the animal, is absolutely at the bottom of the foot. The part of the foot where a large proportion of its laminated attachment is situated being at the inflexions, which Coleman called "the sensible bars," is the most dependent part when stationary, whilst it is still to a greater extent so, at every time the foot alights, when in action.

The character of this laminated attaching medium affords of itself a clue to much understanding of the functions of the foot, by the provision thereby made for motion. By virtue of this construction, these leaves fold up; their action is not in the direction of the axis of the plates, but, for greater extent and exactness, is by their opening and folding like the leaves of a fan; and this view is entirely in accordance with the movements and exertions of the foot—that is, a pressure downwards and backwards, and a lifting upwards posteriorly. Indeed, the plates are reflected with the hoof and cartilages posteriorly, extending beneath the latter, by which they act as stated in my last paper, by constricting the wall, with the sole, whilst the foot is under the greatest exertion.

I shall return, in conclusion, to that phase of my subject with which I set out—contraction—and shall introduce fig. 5, which is a drawing from the hoof of an ass, very truthfully executed by Mr Brett.

This hoof exhibits a case of what, by common consent, is called an extreme one of contraction.



Fig. 5.

The poor animal from which I procured the four feet, all of which had undergone the same deformity as the one here represented, was a proper specimen to decide the question, viz., Is this contraction? If it is, what structures are endowed with a contractile property, what influences such phenomena, and what could be the end of such design? The hoof, as represented, shows an overlapping of the wall at both of the heels and quarters, and the bones, cartilages, and other structures have, in the same ratio, taken on the deformity.

The frog has almost disappeared, and the sole is so reduced in its plantar space as to be scarcely visible. And now comes the question, How has this state of the foot been brought about? Certainly not by the sun's rays, and hardly by standing in luxurious stables and for want of work.

No, but by every influence that is uncongenial to the animal's nature, by constant exposure to wet and filth, perpetual fatigue, bad shoeing, cutting away of the sole and other parts of the hoof unduly, hence the result, a deformity such as we observe.

The poor ass so treated was not one of those of his race more fortunate, which are to be found at Malta, in Sicily, in Spain, over Southern and Central Italy, or in Africa. There we find the animal, instead of being the little despised creature, as with us, finely developed, with hoofs and limbs well formed and strong. There it is no uncommon thing to see a male ass sell for a price equivalent to L.50. These animals, so bred in those climates when contrasted with those of their species as bred and neglected with us, afford a clinching reply to Professor La Fosse, who, in the essay already alluded to, prescribes wet clay for young horses and mules to stand on, and wet felt to be applied to their feet, and also to apply leather soles and cow dung under the shoes.

If the professor and author referred to borrowed the above from our countrymen, he has certainly given back the capital with interest.

The same author goes on and tells us, that where contraction is established, he "applies a sort of dilator, embracing the heels on the inside, and expanding them at will."



I should esteem the practice, attributed to the lowest amongst horse traffickers, of opening the skin of old horses, and inflating the membrane to make the animal look round and fat, as the butchers do a dead calf, in order to extort money by the deception, as an act, bad as it is, not so low in the scale of barbarity as that of forcing open the feet of horses, mules, and asses.

It is greatly to be desired that questions relating to the economy of the foot of the horse were debated under the influence of reason, and that it were not allowable for men to inflict enormous cruelties by working lame horses, and in various other ways torturing them. Custom has reconciled people to endure practices affecting the well-being of the equine race, for which no better apology can be given than the plea which ignorance affords.

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*Case of Capped Elbow.—Excision of the Tumour.*

By C. CUNNINGHAM, V.S., Slateford, near Edinburgh.

EARLY in January last, my attention was called to a cart-horse, with a large tumour on the off elbow. I had frequently seen the case before. Towards the end of last summer I advised the owner to have the tumour removed, and intimated my willingness to perform the operation. Instead, however, of my being allowed to do so, the horse was taken to one of the principal veterinary establishments in Edinburgh, and there, with much ceremony, the operation performed. The after treatment of the case was neglected, and, as a natural consequence, at the end of six weeks, instead of the rounded moveable tumour which previously existed, there remained one nearly equal in size, though of a different shape, much harder, and more firmly connected to the surrounding parts. It was evidently made up of the tissue due to developing granulations. No attention had been paid to favour the approximation of the lips of the wound, and from a case of capped elbow one of fibrous tumour of enormous dimensions resulted. The horse was put to work, and continued working till the end of December, when, becoming lame from the combined effects of the tumour, and an old strain of the flexor tendons, he was put into my hands to do the best I could for him. The tumour was now of a circular flattened shape, about  $6\frac{1}{2}$  inches in diameter, and two in thickness, extremely hard, intimately blended with the skin, and firmly attached to the fascia surrounding the ulna, and to the back part of the pectoralis transversus muscle, presenting a round space on the centre of its posterior surface, which was not covered by the skin. This was, of course, the still gaping wound resulting from the previous operation. I resolved to remove the tumour, which I did on the 17th January, being greatly aided by Professor Gamgee, who in the kindest manner complied with my request to come out and assist me with the operation. Having cast

the horse, an incision was made round the margin of the near surface on the back of the tumour, and extended for an inch or two above and below, the skin was then dissected off the tumour, which, in its turn, was thoroughly dissected from its attachments to the ulna, &c.

The hæmorrhage was inconsiderable, as the larger arteries were promptly secured by ligatures. The edges of the wound were then brought together with metallic sutures, and the horse allowed to rise. His leg was fomented for two bours with cold water, and he was afterwards put into slings. In four or five days suppuration commenced, the sutures were removed shortly afterwards, and the after-treatment consisted simply in keeping the edges of the wound in close contact by strong straps of adhesive plaister, fomenting with cold water occasionally, and attending to the cleanliness of the part.

There was no appearance of symptomatic fever, the wound healed rapidly, and at the end of five weeks the horse was returned to his owner sound, and all that now remains to show the seat of the former tumour is the cicatrix of the wound, and a slight thickening of the skin around it.

*Case of Spinal Meningitis, complicated with Myelitis.*

By the same.

(*To the Editor of the Edinburgh Veterinary Review.*)

SIR,—The accompanying lumbar vertebræ were taken from a Belgian mare, which was destroyed yesterday morning, being useless from paralysis of the hind quarters. Thinking that the singular condition of the spinal cord and its membranes may not be uninteresting to you or the students, I take the liberty of forwarding them.

The mare was at work on Saturday last in the morning, but was unable to go out in the afternoon, and it is supposed that she had been very badly treated by her driver. She got much worse on Sunday and Monday, and lay down on Monday forenoon, and was unable to rise. I saw her on Tuesday evening, and found that her hind quarters were partially paralyzed. She could move the legs a little, and showed slight symptoms of pain when they were struck pretty severely.

I made a *post-mortem examination* this afternoon, and found the thoracic and abdominal viscera healthy. I examined the end of the spinal cord, and the part about a foot anterior to the lumbar vertebræ, and found it apparently healthy, though slightly discoloured (owing to the decomposition principally), with the exception of that lying on the bodies of the two last dorsal vertebræ, which was similar to that of the lumbar region. I may mention that I have not displaced or bruised the cord in any way.—I am, &c.,

C. CUNNINGHAM.

SLATEFORD, 16th April, 1863.

[We have to thank Mr Cunningham for his very interesting case



As such maladies are not of every-day occurrence, we are happy to present the report of the present instance to our readers.

The specimen sent comprises the whole lumbar and part of the sacral regions of the vertebral column, and presents an excellent example of spinal meningitis complicated with myelitis. The exudation of lymph has led to an extensive thickening of the meninges, and more particularly of the dura mater, and its adherent arachnoid; the pia mater is in a state of high vascular congestion, but the exudation into its structure has taken place only to a limited extent. In both cases the morbid condition is most marked opposite the two last lumbar vertebræ, at that part indeed from which the anterior part of the lumbo-sacral plexus takes its origin. The free surface of the arachnoid is covered almost uniformly by a false membrane of nearly a line in thickness, which, under the microscope, shows a distinct tendency to a fibrous arrangement. The areolar adipose tissue, connecting the dura mater to the osseous walls of the spinal canal, presents considerable inflammatory change, appearing at some points as if it contained inspissated pus. The advancing decomposition, however, and the drying resulting from its exposure, prevent a satisfactory examination of this material.

The substance of the cord presents a marked increase of vascularity, evinced in the whole substance by the large and numerous puncta vasculosa, and in the gray matter by a uniform reddish tinge.

The character of the disease is accordingly beyond a doubt. Its occurrence is roundly attributed to ill-usage, and the principal morbid symptoms are general constitutional disturbance and paraplegia. It is probable, however, that the inflammation was, at its outset, confined almost exclusively to the meninges, while the affection of the cord, from which the palsy resulted, was a secondary consequence. In this case the primary symptoms would be such as indicate the affection of the membranes; among these the principal are fever (commonly acute), hard pulse, great pain in the affected region of the spine, distinguished from rheumatism by its being aggravated by pressure on the spinous processes, and general muscular rigidity in the hind limbs and back, with, in some cases, clonic spasm. The latter symptom, however, more commonly indicates the implication of the cord itself.—ED. *Edin. Vet. Rev.*]

# EDINBURGH VETERINARY REVIEW

AND

## *Annals of Comparative Pathology.*

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### THE INTERNATIONAL CONGRESS OF VETERINARY SURGEONS.

THE proposal of which we gave notice in our last impression has been received most favourably wherever it has, to our knowledge, been brought under the attention of professors and practitioners on the continent of Europe. We are happy to learn, also, that Great Britain is not to be behind hand, and a fair number of British veterinarians are expected to pay Hamburgh a visit in July. When we consider the very trifling outlay which such a visit entails, the attractive features of the International Agricultural Exhibition, the special advantages of Hamburgh in offering much that is interesting and beautiful for the sight-seer, and lastly, when, as a Profession, we admit that Meetings and Associations where we can interchange thoughts and acquire information, are attended with great benefits, it cannot be wondered at if the first International Veterinary Congress is likely to prove a great success. With the least possible delay we shall acquaint the profession in this country with the rules to be observed at the Congress, and, meanwhile, we beg to remind our friends that papers referring to losses by disease in districts and counties are specially required. M. Leblanc, the eminent Parisian veterinary surgeon, suggests that the special discussion of papers referring to the evils of empiricism as they affect the veterinary profession and the agricultural community, should be encouraged, and we entertain the same views. Some of our friends have been practising inoculation as a preventative for pleuro-pneumonia in cattle. Statistical papers on such a subject would prove of great interest, and the authors of such accounts would be amply rewarded for their trouble by the manner in which the information would be received, and be prized by the profession throughout Europe. Further particulars on all points relating to the Congress may be obtained from Professor Gamgee, New Veterinary College, Edinburgh.



LEGISLATION RELATING TO THE PREVENTION OF  
DISEASES IN ANIMALS.

A BILL is before Parliament, introduced by one of the most zealous promoters of the science and art of agriculture, Edward Holland, Esq., M.P. for Eversham. That Bill is devised so as to confer a great boon on Veterinary Surgeons, and ensure their election as Inspectors of Fairs and Markets throughout the United Kingdom. We have long insisted on the importance of such a measure, and we believe that the British Government is fully alive to the necessity for some interference, whatever that may be, with the present reckless system of permitting animals affected with contagious diseases to be travelled about and sold, to the manifest danger of all stock they may directly or indirectly approach. One most important result is likely to follow the passing of any Act which must come into operation in the autumn of the present year, viz., that the attention of Veterinarians will be more directed to the study of the causes and means of prevention of widespread maladies. We thank all our friends most cordially for the most valuable information, a portion of which only we publish in the present number. With such statements before the country as those contained in our notices of the Health of Stock in various counties during the year 1862, it is impossible that those whose duty it is most directly to interfere for the country's welfare can look on and be inactive. It may be considered some small return to all who have favoured us with information to know, that they have materially contributed to arm with facts those who can now use them for the general benefit of the Veterinary Profession and of the public at large. Members of Parliament can now hold in their hands a mass of evidence, than which none more reliable could be wished for, indicating the real necessities of stockowners, and the best means to encourage the development of the resources of the United Kingdom as a meat-producing country.

If a good work has been commenced, let us not imagine it at an end. We can do much more, and in a few years the aspect of the Veterinary Profession will be totally changed. We have before predicted that which has turned out true, and nothing ever anticipated can have been more satisfactorily realized than will be the marked change for the better in the standing of Veterinarians, when a proper system has been developed to banish from our shores the diseases that have destroyed our cattle during the last twenty years.

## PROFESSOR DICK AND VETERINARY STUDENTS.

SYMPTOMS of disaffection, like the signs of other moral or physical disease, must have their cause. It is a remarkable fact, that in spite of much mismanagement in veterinary colleges, the students annually connected with them have manifested more than ordinary good feeling towards their teachers, but last year the Clyde Street students avoided attendance at a dinner which formerly was looked forward to by them with great pleasure. This year they have manifested the same feeling and we cannot wonder at it, if Professor Dick's notions are that veterinary students can only be dealt with as unruly horses, by holding the reins firmly, and endeavouring "*to drive up to the mark.*" Example can effect more than 'driving,' and we regret to see that the latter system has answered so badly as to lead to the utterance of words such as Professor Dick used at his dinner. He said, "It was no easy task to carry through a whole session with a class of some eighty or ninety young men—wild sometimes and riotous, careless and sometimes stupid, sometimes high-spirited and at other times taking notions of their own. This was no easy task, it was no easy matter to curb such pupils." We assert that this is no less than a libel on the character of veterinary students, which would doubtless have been resented had any of them been present. Such words should have been met by something different to "renewed laughter," and it is especially painful to know that they have been uttered by one who owes more to the kind consideration of veterinary students than perhaps any other individual in the United Kingdom.

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## ROYAL COLLEGE OF VETERINARY SURGEONS.

## QUARTERLY MEETING OF COUNCIL.

THE Quarterly Meeting of the Council was held on the 8th day of April, 1863.

Present:—The President, Messrs Braby, Burley, Ellis, Ernes, Harp-ley, Hunt, Jex, Lawson, Robinson, Silvester, Wilkinson, Withers, and Secretary. The President in the Chair.

The Minutes of the preceding Meeting were read and confirmed.

A letter was read from Mr Joss, M.R.C.V.S., of Mintlaw, Aberdeenshire, from which it appeared that his name had been originally misspelt in his diploma, and afterwards erased. The diploma was submitted to the inspection of the Council. Under the circumstances



the Council deemed it advisable that Mr Joss should be furnished with a new diploma, the one defaced being cancelled.

Letters were read from Professor Brande and Dr Struthers, relative to the meeting of the Court of Examiners, when it was determined that the London examinations should take place in the week commencing April 27th, and following days.

The Secretary announced that he had received the volumes wanting to complete the *Veterinarian* from Messrs Braby and Goodwin; the body corporate now possessed a perfect copy of that journal.

The thanks of the Council were ordered to be given for these presentations.

The Finance Committee reported that they had examined the vouchers and receipts of payment during the past quarter, and found them correct.

The quarterly balance-sheet of the treasurer's account was read, from which it appears that the liabilities for the quarter ending April 1st amounted to L.119, 1s. 9d.

It was moved by Mr Ernes, and seconded by Mr Braby, "That the report from the Finance Committee be received and adopted."—Carried.

The House Committee presented its report. They recommended that a cocoa-nut matting for the students' room, an elastic tube and table-lamp for the use of general committees, and a die for stamping the books in the library, be purchased.

The report was received and adopted.

The subject of the gratuitous distribution of the *Register* was discussed. On the motion of Mr Ernes, seconded by Mr Lawson, "That it be distributed gratuitously both to members of the profession and to the public in general," was not carried.

It was then moved by Mr Silvester, and seconded by Mr Jex, "That the *Register* be sold at One Shilling, and that all public institutions be furnished with it free of expense on application to the president or secretary."—Carried.

It was moved by Mr Hunt, and seconded by Mr Robinson, "That each Master of Hounds be also furnished with a copy of the *Register* gratuitously."—Carried.

The arrangements for the forthcoming annual meeting were next considered, when

It was moved by Mr Ernes, and seconded by Mr Wilkinson, "That Mr Clement Lowe and Mr Alfred James Rogers be appointed auditors."—Carried.

Messrs Wilkinson, Ernes, Harpley, Brady, and Secretary, were appointed the Committee for preparing the Annual Report.

A discussion then took place relative to the steps which should be taken for the better protection of Veterinary Surgeons.

It was moved by Mr Ernes, and seconded by Mr Harpley,—“That a Committee, consisting of the following gentlemen, viz., Messrs Ernes, Field, Goodwin, Gowing, Harpley, Jex, Mavor, Moon, and Varnell, be appointed for the purpose of preparing a Petition with a view to the

obtainment of an Act of Parliament for the better protection of Veterinary Surgeons: and also obtaining for them the immunities and exemptions to which they deem themselves justly entitled.”—Carried.

It was proposed by Mr Harpley, and seconded by Mr Ellis,—“That an address be presented to Her Majesty through the Home Secretary, congratulating her on the Marriage of His Royal Highness the Prince of Wales with the Princess Alexandra of Denmark.”—Carried.

Mr Harpley and the Secretary were appointed a Committee to prepare the address.

The Memorial received from the Home Office for the incorporation of the Glasgow Veterinary College was next read. A lengthy discussion ensued, when

It was moved by Mr Robinson, and seconded by Mr Silvester,—“That a letter similar to the one dated May 19, 1858, which was at that time sent to the Home Office on the proposed application of the New Edinburgh Veterinary College, be now transmitted to the Home Office in reply to Sir George Grey’s letter, dated March 26, 1863, accompanying the memorial from James M’Call, praying for the application of the Glasgow Veterinary College, and that a copy of the Charter be likewise sent with the letter.”—Carried.

500 copies of the Charter and Bye-laws were ordered to be printed; and also 200 copies of the Diploma. A new Register Book was likewise ordered to be purchased for entering the names of the Members of the Body Corporate.

It was ordered that any Book required for a Member of the Body Corporate should not be taken from out of the custody of the Librarian.

Cheques were ordered for current expenses.

*Copy of the Congratulatory Address presented to Her Majesty.*

“TO THE QUEEN’S MOST EXCELLENT MAJESTY.

“May it please your Majesty,—“We, the President, Vice-Presidents, and Council of the Royal College of Veterinary Surgeons, desire humbly to approach your Majesty, to express our heartfelt congratulations on the Marriage of His Royal Highness the Prince of Wales with Her Royal Highness the Princess Alexandra of Denmark.

“We earnestly pray that this auspicious event may conduce to the personal and domestic happiness of your Majesty, and that under the all-powerful influence of your Majesty’s example, it may also ensure the fulfilment of the sanguine and well-founded hopes of a loving and devoted people.

“Given under our common seal,

“This 10th day of April, 1863.

“JAS. BEART SIMONDS,

“*President.*

“By order of the Council,

“WM. HY. COATES, *Secretary.*”



*Reply to the Address of Congratulation to Her Majesty.*

“ WHITEHALL, 23rd April, 1863.

‘ SIR,—I have had the honour to lay before the Queen the loyal and dutiful Address of the Royal College of Veterinary Surgeons on the occasion of the Marriage of His Royal Highness the Prince of Wales, and I have to inform you, that Her Majesty was pleased to receive the Address very graciously.—I am, Sir, your obedient Servant,

“ G. GREY.

“The Secretary to the Royal College  
“of Veterinary Surgeons.”

## MEETINGS OF THE SCOTTISH BOARD OF EXAMINERS.

On Monday morning, the Board of Examiners of the Royal College of Veterinary Surgeons concluded its series of meetings for 1863 for the examination of candidates for the diploma. Thirty-nine candidates presented themselves, and were examined according to the regulations of the Royal College, at four tables, as follows:—

1. *Anatomy and Physiology*.—Professor Miller, Dr John Struthers, and Mr William Robertson, Kelso.

2. *Chemistry and Materia Medica*.—Dr Dunsmure and Dr Warburton Begbie.

3. *Pathology of the Horse*.—Mr John Lawson, Manchester; Mr William Cockburn, Glasgow; and Mr Benjamin Cartledge, Sheffield.

4. *Pathology of the Ox, Sheep, Pig, Dog, &c.*—Mr James Cowie, Montrose; and Mr Charles Secker, Knaresborough.

Immediately after the conclusion of the examination, the distribution of diplomas took place—Professor Miller in the chair.

Professor MILLER said—We have now brought our labours to a close. We have had thirty-nine candidates—a certain number from the Edinburgh Veterinary College, a larger proportion from the New Veterinary College, and one comes from a school of perhaps greater efficiency—that of personal observation—one who had received a certificate from the Highland Society on a previous occasion, and who now comes and qualifies himself here. Of the thirty-nine, thirty-five have passed, a majority which is as creditable to you as the minority is creditable to ourselves. You are aware that we are here to do our duty impartially in the office deputed to us by the Royal College of Veterinary Surgeons, and it is now our duty to give you your diplomas, which you will find confer on you the title of veterinary surgeons, and this Board only can legally grant you that distinction.

Professor Miller then proceeded to distribute the diplomas to the following gentlemen, who, after the three days of examination, were found qualified to hold these diplomas of the Royal College, constitut-

ing them legal practitioners, and authorising them to use the title of veterinary surgeons:—

FROM THE EDINBURGH NEW VETERINARY COLLEGE.

William Anderson, Borthwick Brae, Hawick.  
 James Baillie, Edgehead, Dalkeith.  
 Hugh Massey Baker, Langlee, Jedburgh.  
 James Boyd, Silvermoor, Lanark.  
 Thomas Browne, Wing, Buckinghamshire.  
 Nicholas Carney, Ardwick, Manchester.  
 William Cumming, Edinburgh.  
 William Duguid, New Veterinary College, Edinburgh.  
 Thomas Harwood, Liverpool.  
 William Irvine, Girvan, Ayrshire.  
 Daniel M'Gregor, Seaton-Delaval, Northumberland.  
 John Adam M'Bride, Glasgow.  
 Patrick M'Kenzie, Cargill, Perthshire.  
 David Menzies, Bellfield, Abington, Lanarkshire.  
 Robert Morris, Wick, Caithness.  
 Robert Morton, Mains of Stobhall, Perthshire.  
 John Panton, Blair-Athole, Perthshire.  
 James Henry Reynolds, Newark, Nottinghamshire.  
 Alfred E. G. Robinson, Bolton-le-Moors, Lancashire.  
 John Nelson Taylor, Haworth, Yorkshire.  
 James Thomson, Tarland, Aberdeenshire.  
 Robert Watson, Kelso, Roxburghshire.

FROM THE EDINBURGH VETERINARY COLLEGE.

Hugh Anderson, Newtonwards, co. Down.  
 Edward Coleman, Sutton, Surrey.  
 William Copland, Little Sutton, Chester.  
 William Eastcott, Broadwood, Devonshire.  
 William Evans, Mitchelston, co. Cork.  
 Nicholas Harrison, Kirkby-Lonsdale, Westmoreland.  
 Benjamin R. Kirk, Snaith, Yorkshire.  
 John M'Laren, Newport, Yorkshire.  
 Edward Malcolm, Longslight, Manchester.  
 Edward Nuttall, Bury, Lancashire.  
 William Pullin, Dublin.  
 Benjamin Smith, Barnsley, Yorkshire.  
 William Worthington, Wrightington, Lancashire.

Professor Miller then, after a few preliminary remarks, said—If there are any of those whom we have not been privileged to pass present, I would entreat them to think well of their position,—not to be downcast, not to be thrown back, but, on the contrary, to be inspired with a fresh energy, in order that, on a future occasion, which we trust is before them and us, they shall pass, and pass with



honour. Just as you put a horse to a fence,—if he makes a mistake or refuses it in the first instance, you do not give it up, but let him look at it,—for they say a horse likes to put his nose to everything. You have had your nose at this to-day, and you know what it is, and you will not be afraid of it in the future; and then give your horse the spurs, and give him a lift, and the probability is that he will leap higher and cleaner than before,—perhaps a couple of feet higher than he would have done at first. But then you must be your own riders, you must have the owner upon his own horse. We cannot help you; but if simply kind feeling will help you over, you are sure of that; and we shall be glad to welcome you on a future occasion. Those of you who have obtained your diploma—who have gone over—some of you with flying colours, and some of you touching and scraping a little, I have only to congratulate; and so far as we could see, it is well deserved. We trust you will now continue your studies as faithfully and as energetically as before. Now you have a higher field of study than before, and unless you maintain your diligence as students, you will lag behind. You have a duty to the profession, and I trust you will not be contented with the miserable aim of leaving that profession at least no worse of having held yourself as a constituent member of it, but that you will have a higher and a better aim, and when you have to part company with it as professional men, you will be able to say that it has continued its progress, and that you have been privileged by your own exertions, under the guidance of a good providence, to have contributed somewhat to that elevation. Leave it better than you found it. You have a duty to your employers. We know that in your profession temptation sometimes comes, but I need not say anything to call to your minds that sound old adage, “Honesty is the best policy.” You have a duty to discharge to your patients, and that is not only to treat them with skill and care, but with humanity and with kindness. They cannot requite you with words as our patients oftentimes do, but there is a look and an action which is sometimes more eloquent than words. A lick of the tongue of a grateful dog; a rub of the nose of a cow or a horse which has been relieved from pain by your kindness and attention, will sometimes be not the least important and the least valuable part of your professional reward. Some of you are going abroad, I understand. We trust you will carry that humanity there with you, which is indigenous, we are thankful to say, to our race. We have a Martin’s Act here, and it is not very creditable to us that we require it to protect the dumb creatures from injury and cruelty, but it is so far creditable to us that when it is found necessary we have such an act. You are going, some of you, to Paris, where there is no Martin’s Act—not where there is no necessity for it, but where the necessity for it is not appreciated. We trust those of you who go there will make due observation, and we have no doubt you will bring back valuable acquisitions to your profession; but do not bring back your feelings of

humanity blunted and tarnished. Let the disgraceful and discreditable practice of vivisection, which is conducted openly in the public veterinary schools, be the subject of your scrupulous and scientific inquiry—not with the view of advancing physiological facts—not as a poor apology; for to some extent it is a poor apology at the best—the wretched excuse, of enabling them to teach better than otherwise could have been done upon the dead animal, the ordinary operations of your profession. The idea of submitting horses, day after day—as many as eight horses in a day—alive, without any chloroform, without any anæsthetic, going on operating continuously, student after student, operation after operation, so long as the poor dumb creature lives, lives in the most miserable suffering and pain, it seems to me a thing discreditable alike to the science of the profession, and to the morals and honour of those concerned. I had hoped that this had been put a stop to. I had taken it for granted, when we heard some three or four years ago that the Emperor had had his attention attracted to it, that with that common sense which so peculiarly and largely belongs to him, he would at once have put a stop to it. Perhaps he is not aware that it is still in existence; but when you come in contact with such things as these, we trust this will not steel your ordinary feelings of humanity, but that it will render them more acute, and that when you come back to your patients at home, your humanity, care, and kindness, will be commensurate with the skill and efficiency which you have shown here. I have to detain you no longer, except to wish you all success, and comfort, and prosperity, in the practice of that most important profession of which you are now members. To use a plain illustration in connection with your own profession, we have entered upon the very serious responsibility of giving you this morning a warrant of soundness. We trust we are not wrong in this estimation of your character and condition, but it is for you to determine in your future going, whether we are right or not; and we only trust that you will so conduct yourself, that you will throw out no bog-spavin, splints, and ringbones, or anything else, and in no manner break down, or threaten to break down the integrity or completeness, but continue that integrity in wind and limb. And, in your latter days, if you will allow me to continue the somewhat professional illustration, that when it comes to be the evening of your days, that you will still retain your integrity well and sound, as I have said in wind and limb; that each one of you may find a snug loose-box and a green paddock on which to pass these latter days; and when these come to an end, that you will be enabled to enter, through God's grace, upon something far better. But whether you look upon your profession as your master, or whether you look upon your employers as your master, or whether you look upon yourselves as your master, through your future career, or whether you associate all these three, and try to serve them faithfully, endeavouring to solve that moral paradox of not being able to serve two masters when your interests disagree, but being able to serve your master here only by serving the other Master



—the great Master of all—above; and the simple formula for the safe and faithful solution of that problem I need not tell you is, by making your interests conform, and that is by seeing that the interests of the Master above are paramount. We now wish you, as I have already said, good health, good success, and good morning.

Dr JOHN STRUTHERS said—He had now put into the hands of every one of the candidates the laws of the charter, and bye-laws of the college. He had to request that they would read that charter, and there was one part with which he wished them particularly acquainted, of which he would read a few lines. Dr Struthers then read the following extract:—

“And We do further Declare and Grant, That the veterinary art as practised by the members of the said body politic and corporate shall be henceforth deemed and taken to be and recognised as a profession, and that the members of the said body politic and corporate solely and exclusively of all other persons whomsoever shall be deemed and taken and recognised to be members of the said profession or professors of the said art, and shall be individually known and distinguished by the name or title of veterinary surgeons.”

He thought he had taken pretty good care, as secretary of this Board, to let the candidates know when they came to him that they had nothing to do with any of the veterinary schools. It was of great importance that it should be understood by the public that this college was an incorporation of the veterinary profession, and that they had nothing to do with any particular school. There had been a great deal of confusion in past years with regard to what the licensing board was, and what the school was. They were to the veterinary profession exactly what the Royal Colleges of Surgeons and Physicians were to the medical profession. Before he sat down, they would, as an examiner at the table of physiology and anatomy, allow him to say that he was extremely gratified with the appearance of the candidates. Their acquaintance with anatomy and physiology was of the extent which was generally manifested by those who had studied much longer. It had seemed to him that the students were improving in this respect. At the anatomical and physiological table, he must express his impression that the students were improving in their knowledge.

Mr COWIE of Montrose proposed a vote of thanks to Professor Miller as chairman.

Professor MILLER replied, and proposed a vote of thanks to Dr Struthers for his services as secretary.

Dr STRUTHERS replied, and the meeting then separated.

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#### NEW VETERINARY COLLEGE, EDINBURGH.

ON Wednesday, the 22nd April, Professor Gamgee delivered a public lecture in the New Veterinary College, on the Diseases of the Domestic Animals in relation to Public Health. After the lecture, Professor Gamgee distributed the following prizes:—

*Free Studentship and Silver Medal.*—(This prize is awarded to the best junior student of the year.)—1st, Mr Daniel Gibbon, London; 2nd, Mr William Elder, Stirling.

*Anatomy.*—1st, Silver Medal, Mr Thomas Harwood, Liverpool; 2nd, Do. do., Mr Robert Morris, Caithness.

*Physiology.*—Silver Medal—Mr Robert Morris, Caithness.

*Chemistry.*—1st, Silver Medal—Senior Students—Mr Robert Morris, Caithness; 2nd, Do. do.—Junior Students—Mr William Elder, Stirling.

*Materia Medica.*—Silver Medal—Mr Robert Morris, Caithness.

*Veterinary Medicine and Surgery.*—1st, Silver Medal—Mr David Menzies, Bellfield, Abington, Lanarkshire; 2nd, Do. do.—Mr Robert Morris, Caithness.

*Practice of Farriery.*—1st, Mr John Panton, Blairgowrie, and Mr William Anderson, Borthwickbrae—equal.

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## MEETING OF A SOCIETY.

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### ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A MEETING of the members of the Royal Agricultural Association took place on Wednesday last, at their rooms, in Hanover Square—Mr Raymond Barker in the chair.

#### ADULTERATION OF LINSEED CAKE.

Professor VOELCKER, in introducing to the notice of the meeting the subject of the Adulteration of Linseed Cake, said that it was a subject of special importance at the present time, when not only oil-cake, but all kinds of feeding mixtures were largely employed by the British farmer in fattening cattle. It was no doubt owing to the great demand for all kinds of feeding materials that those which admitted of ready adulteration were frequently found to be mixed up sometimes with matter which was injurious to health, and at other times with substances which possessed no feeding properties, or feeding properties of a very doubtful character; in point of fact, the increasing demand for oil-cake had led to an amount of adulteration of the extent of which the practical farmer was hardly aware. Any one who looked at the various descriptions of oil-cake exhibited for sale at the stalls in any large market could not fail to be struck with the very great difference which was apparent in its colour and composition. No such difference was visible in the seed, samples of which he had before him, whereas if they contrasted the various specimens of oil-cake which lay upon the table, they would find some specimens nearly as white as poppy-cake, and others nearly as dark as rape-cake, while one specimen was exhibited which gave them a proper idea of the agreeable colour of the linseed itself. It therefore did not require any great amount of analytical skill to convince them that in the one case the oil-cake was adulterated with white poppy-cake, and that the dark-coloured cake was in all probability adulterated with rape, while the medium colour specimen would represent the pure linseed-cake. The very appearance of the cake exhibited showed that it had undergone some other process than the mere crushing for the extraction of the oil, and which process would in all probability, influence its quality. Those manufacturers who confined themselves to the operation of mixing linseed of an inferior description with that of a superior quality inflicted less injury upon the practical farmers than others who were guilty of adulterating it with foreign substances, because in such cases the farmers lost in point



of money only, because they paid a high price for inferior cake like rape-cake, whereas in many instances the cattle were seriously injured and even poisoned by eating oil-cake adulterated with foreign matter. He would, in the first place, direct their attention to those admixtures which were in themselves injurious, and, secondly, to admixtures which became injurious during the time the cake was being kept. There was a variety of things added to oil-cake which deteriorated the quality of meat by imparting a bad flavour to it, which was the reason why butchers would not give the same price for cattle fed upon inferior and bad tasting oil-cake which they would for those fed upon cake of a superior quality. A good pure linseed-cake ought to be made of nothing but fair linseed—he did not mean to say absolutely pure, because none such was to be found in the market, and the purity of linseed varied to such a degree that it was in many cases no guarantee when a manufacturer advertised his oil-cake as being made from pure linseed as imported. He had before him a variety of samples which had been collected at random as linseed ordinarily sold in our markets, and in one of those samples, which was termed as of middling quality, he found no less than  $34\frac{1}{2}$  per cent. of foreign seeds which were not linseed. A manufacturer, therefore, who stamped such seed as genuine linseed would not be dealing honestly with his customers, even although it might be sold as imported. In order to show to what an extent the impurities existed in the ordinary linseed as sold in the market, he had found, on actual examination of the samples, that in Bombay linseed they were  $4\frac{1}{2}$  per cent.; in a sample of fine quality,  $1\frac{3}{4}$  per cent.; in Black Sea linseed, 20 per cent.; in a second sample, 12 per cent.; in Odessa, linseed,  $12\frac{1}{2}$  per cent.; in medium Riga seed, 35 per cent.; in Merzhanski linseed, 7 per cent.; in fine Black Sea linseed, imported in 1861 and 1862, and considered of good average quality, 19 per cent.; in fine Petersburg, 3 per cent.; in the common Petersburg Rigelf linseed, 41 per cent.; second quality,  $43\frac{1}{2}$  per cent.; and in the average quality of Riga crushing linseed, the impurities were no less than  $45\frac{1}{2}$  per cent. In another specimen of the common Riga linseed, imported in 1862, the impurities amounted to 42 per cent., consisting of 22 per cent. of Spurry (*Specula arvensis*), 3 per cent. of *Lolium temulentum* (Darnel), 3 per cent. of Dodder (*Carmelina*), 2 per cent. of Knot Grass (*Polygonus aviculare*), 1 per cent. of *Chenorodium*, and 11 per cent. of mustard and other seeds; and above all, he found that in the common Petersburg Rigelf linseed, a large portion of which found its way to Hull and other ports, the impurities actually amounted to no less than 70 per cent., while even that which came from Archangel was adulterated to the extent of  $34\frac{1}{2}$  per cent. In the samples which he had examined he had detected not only many seeds injurious to the quality of the cake, but several which were actually poisonous. He had taken the trouble of separating from several samples of linseed the foreign seeds, and in one particular sample he counted no less than twenty-nine different kinds of weed seeds, and among those which were more or less injurious were the common Darnel and the corncockle, which often produce very injurious effects on the animal system. In some samples the wild radish seed occurred, which was a very pungent seed. Wild rape was frequently found in foreign linseed. Then they found Charnock or common wild mustard. There were seeds which were positively known to be injurious to cattle, but there were many others in the ordinary linseed-cake sold in the market which impaired the quality of the meat, though not so injurious to the health of the animals. Such were the seeds of the gold-of-pleasure plant, which imparted a disagreeable taste to the meat, and a deep yellow colour to the fat. The parching flax was another description of seed that injured cattle, but which he had found in the sample of oil-cake before him. Good oil-cake ought to be of a bright colour, and when mixed with water to form a smooth and an agreeable tasting and smelling jelly, while that which was adulterated by the mixture of other injurious seeds, did not only not powder and mix well, but often had a disagreeable smell as if it had been kept too long. If oil-cake when mixed with water did not become gelatinous, it was not cake of the best description, but it did not therefore follow that it was a good cake simply because it might become gelatinous by being so mixed, because it would become



equally gelatinous when adulterated with such seeds as rape, with mustard, or Dodder seeds, which latter were in point of fact more gelatinous than linseed itself. When cake containing these seeds was mixed with water, a strong pungent smell of mustard was developed, and oil-cake ought always to be tested in that way. Rape-cake, especially that which was sold as Indian rape-cake, generally contained a large amount of wild mustard seed, and when mixed often became so pungent as to be highly injurious to cattle; and he had before him a sample of that description of cake which had actually killed three oxen. Good rape-cake, when examined with an ordinary pocket lens, ought to exhibit nothing but the husks of the linseed when made into a jelly, but in the specimens before he could easily discover and single out the seeds of other plants. They could easily recognise the husks of other seeds in that way even in comparatively pure linseed cake, whether it was made of bad seed, or seed intermixed with other seeds, such as the hard *Polygonia* seeds, or the seed of the climbing buckwheat, because the husks must be left in the cake. In that way they could discover the admixture of cotton-seed from the very peculiar character of the husk. He had before him a sample of the cake branded as pure which contained cotton husks, which were very easily recognisable. He had not included bran in his list of adulterating materials, because it possessed some feeding properties, and might be advantageously given with linseed-cake; but it was much more desirable for the farmer to buy bran and pure oil-cake separately than to buy the two mixed together; because it was impossible to say how much bran was mixed with the oil-cake; and it was often used for adulterating it to such an extent that it might be separated mechanically. There were certain seeds which were peculiarly rich in albuminous matter, or, in other words, which contained a good deal of nitrogenous substances, in which refuse matter, like bran, was rather deficient; and by mixing linseed with bran, and at the same time adding rapeseed, they made up for the deficiency of nitrogenous matter in the bran by its excess in the rapeseed. Mere analysis of the cake did not give any idea of its purity, for he had before him samples which contained bran in such large proportion that it could be separated mechanically, and yet which, on analysis was found to contain an abundance of nitrogenous matter. The best kind of cotton-cake was hardly ever seen in the market now, in consequence of the American war; but whole seed cotton-cake was very injurious, because it was not decottonated, or, in other words, being made from the husk, as well as the kernel, the whole of the cotton fibre was not extracted, and the animal had not the power of ejecting it from the stomach; a stoppage took place in the lower intestines, inflammation ensued, and death followed. All the results followed, in fact, which would be produced by a strong irritant metallic poison; and it was therefore highly dangerous to give indiscriminately whole seed cotton-cake to cattle. He had found masses of matter in such cases in the lower intestines almost as large and as hard as cricket balls. Earth-nut cake was very nutritious when made from the kernel alone, but if made from the husk as well, the same disagreeable and injurious properties became apparent. By earth-nut he did not mean the ordinary nut-cake which was made from the refuse kernel of the palm-nut. Earth-nut was a different thing; it produced a hard kernel, which made a nutritious cake; but the whole seed cake was not so nutritious. There was another kind of nut-cake which ought by no means to be used for feeding purposes, but was only fit for manure. It was made from the curcus bean, a parching bean growing in the Cape de Verd Islands, three or four of which were sufficient to produce a very powerful affection of the bowels. He had known several cases of cattle poisoning in consequence of eating cake adulterated with curcus bean. Poppy cake was a good cake when it could be had in a fresh condition. It was remarkably sweet to the taste, and very nutritious; but in a country like England, where there was not a constant demand for it, and where it was a drug in the market, in consequence of not finding a ready sale, it became mouldy, and acid to the taste, consequently more or less injurious to cattle. All kinds of oil-cake would spoil by being kept too long, or kept in damp places, and often proved a serious injury to cattle. A mixture of bran would very often produce mouldiness in oil-cake, and that was one very



great objection to the use of bran, because it admitted into the cake more readily the damp air. That showed the necessity of stowing the cake in dry places. If that were not done, the worst description of cake, containing bran and other impurities, would become very mouldy, while the good cake itself would lose many of its qualities. Whatever may have been the original quality of the cake, it became most injurious to cattle as soon as it became mouldy, and he could find no other explanation for the undoubted injury which oil-cake had done to cattle, and which at one time was of a most destructive character. If oil-cake was kept for a long time, a sort of fungus was produced which could only be detected by a microscope, which fungus did a great deal of mischief, and mouldy oats had in several cases proved highly injurious. Analysis might be useful to determine the amount of albuminous matter and the other chemical constituents of the cake, but it could not indicate whether it was wholesome or not. What use would it be analysing mouldy cake when it was known in many cases to have caused the death of cattle? All refuse matters had a tendency to become mouldy. He had before him a strong mixture, which had been bought at a very low price, and on examining it he found it to consist of the sweepings of an oil-mill. He found it very injurious to cattle; but on carefully separating the constituents of the cake, he could not find anything injurious in them. On examining it, however, with a microscope he discovered insipient fungi, which had since developed itself all through the cake. The use of that cake had actually killed fourteen sheep, three horses, and a pony, all within two days, he believed, which abundantly demonstrated the danger of buying any cheap description of oil-cake, and trusting to analytical results to ascertain whether it was good or not. It was not always safe even to trust to feeding with barley-meal, which farmers themselves sent to the millers to be ground, for if he had the misfortune to fall into the hands of a dishonest miller, he might have his meal returned with a mixture of sawdust or sand, as had actually occurred in two instances, in which the meal having been found to disagree with cattle had been submitted to him to discover the cause. The only safeguard the farmer had was to deal with well-known firms, and he must alway remember that it was impossible to get a good description of oil-cake at a low price, for the simple reason that the low-priced oil-cake was always mixed with other feeding materials of a less expensive nature, while, as he had shown, even the "genuine as imported" oil-cake was too often mixed with foreign seeds of a character injurious to the cattle. He had not treated the question upon the present occasion either chemically or analytically, his intention being merely to call the attention of the farming community to the different description of seeds, and to the materials by which oil-cake was adulterated, and to point out the simple means of detecting them—namely, by an examination of the husks. The whole subject was one of great importance, and many points in reference to oil-cake had, he was convinced, been hitherto overlooked, which notwithstanding had a material bearing upon the interest of the farmer, and would well repay him by their investigation.

Lord FAVERSHAM, in moving a cordial vote of thanks to the learned Professor for his valuable lecture, took the opportunity of asking him whether his attention had been directed to the feeding properties of malt, and whether he considered that the present duty on malt operated as an impediment to farmers in feeding cattle. He mentioned the point because he perceived that the Chancellor of the Exchequer had, in reply to a deputation on the subject of the Malt-duty, expressed a wish to obtain the opinion of agriculturists of experience as to the feeding of cattle upon malt. If that experience was favourable, changes might be made which would do away with the necessity of buying the adulterated oil-cake now in use. The question of feeding cattle was the more important because it had been stated that large quantities of land both in England and Ireland were passing out of cultivation as far as regarded cereal crops.

Mr FISHER HOBBS, in seconding the vote of thanks, observed that the statements they had heard from the learned Professor fully bore out the results of an investigation made some years ago as to the extensive adulteration of linseed-cake. It was quite evident that there was the greatest imaginable difficulty in



getting anything like good pure oil-cake. With respect to the feeding properties of malt, they were really so great that whenever he entered animals for competition he invariably fed them on that material, and with the most successful results; and as far as his experience went, it would be far preferable to oil-cake if it could be obtained at a reasonable rate.

Professor VOELCKER, in reply to Lord Faversham's question, was of opinion that they hitherto had very few experiments of a conclusive character in regard to the feeding qualities of malt, and he had great hesitation in expressing anything like a decided opinion upon the subject. The only experiments that he knew of were those made by Mr Hudson of Castle Acre. Mr Lawes had a few desultory experiments by Dr Hartley Thompson, which were made on a very limited scale; at the same time, there was a good deal of floating experience which he thought might be carefully collected. Feeders of stock he knew spoke very highly of malt when an animal was to be got into prime condition, and it had to have a large amount of food supplied to it in order to develop rapidly. Malt, when judiciously administered, seemed to help the digestion of animals wonderfully. Another question which struck him as being of considerable practical importance was, whether food which in itself was of a somewhat indigestible character, might not be made more available by the addition of malt. He could not, in the present limited state of their experience, say whether it would be desirable altogether to replace barley-meal with malt, but he had no hesitation whatever in saying that in certain particular instances permission to farmers to convert barley into malt for feeding purposes would be a great boon to the farming community.

Mr FRERE was of opinion that some of the oil-cakes which had been mentioned by the learned Professor might be given with great advantage to store sheep, and would be extremely valuable in correcting a purgative tendency. They might be given without the danger of inflammation, which arose when those cakes were given in excess to beasts.

Mr HOLLAND, M.P., wished to ask the learned Professor a question as to the feeding properties of pure linseed-cake compared with those of oil-cake mixed with bran. Supposing them to be mixed in proper proportions, would not cake mixed with bran be better for feeding purposes than pure oil-cake, weight for weight?

Professor VOELCKER had no hesitation in answering in the affirmative—namely, that a certain proportion of bran would be very useful, but it was very desirable that the farmer should mix it himself. Milking cows fed on oil-cake mixed with bran gave a larger supply of milk, while at the same time it was of a richer quality than if they were fed on oil-cake alone. There was no doubt that bran bettered the digestion. In most descriptions of oil-cake there was a very large proportion of albuminous matter, and the addition of bran rendered a very considerable portion of that albuminous matter valuable which would otherwise pass off in the dung.

Mr HOLLAND, M.P., said the difficulty of the farmer was that when he went into the market he found the pure oil-cake cried down, while at the same time he had to pay as high a price for oil-cake mixed with bran.

Professor VOELCKER thought the objection would vanish if oil-cake were professedly sold as oil-cake mixed with bran.

Mr LEE suggested whether it would be possible by some chemical means to advance the barley a stage or two in the direction of malting, but at the same time prevent its being rendered valuable for brewing purposes, because he thought the Chancellor of the Exchequer would hardly give up so large a duty as that derived from malt, merely to enable the farmers to feed cattle on it.

Mr HOLLAND reminded the meeting that several years ago, when the Malt-duty question was under discussion, a Committee, which took into consideration the feeding qualities of malt, came to the conclusion that it was very good to mix with other food, but that as a food itself it was not worth considering.

The subject then dropped, and a vote of thanks to the Chairman concluded the proceedings.



## PERISCOPE.

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## ON THE CHANGES WHICH CERTAIN BODIES UNDERGO OUTSIDE THE ANIMAL BODY, AND WHICH AGREE WITH THOSE RESULTING FROM THE METAMORPHOSES OF THE TISSUES.

By J. VAN DEEN.

THE influence which electricity exerts upon the transformation of the tissues is still quite unknown, and has, of late, formed the subject of a series of investigations by J. Van Deen. The results at which he has arrived confirm his early researches upon the action of the constant electric current upon glycerine and uric acid. He has also investigated the action of ozone and of nitric acid, aided by heat, upon certain organic bodies; and in order to learn more precisely their function during life, he has studied the action of the pancreas and liver outside the animal body, upon many of the proximate principles. We shall at present confine ourselves to a very succinct account, drawn up by himself, of the results at which he has arrived, reserving a complete description of the methods of research which he employed, and of the conclusions to which they have led, until he shall have fulfilled his promise of giving a more extended and minute description of them.

By the action of the constant current were obtained—

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| <p><i>a.</i> From albumen:</p> <ol style="list-style-type: none"> <li>1. Cells which precisely resembled cytoïd corpuscles.</li> <li>2. A substance insoluble in water (fibrin?)</li> <li>3. Urea.</li> <li>4. Allantoin.</li> <li>5. Uric acid (most probably).</li> </ol> <p><i>b.</i> From gelatin:</p> <ol style="list-style-type: none"> <li>1. Morphological substances.</li> <li>2. Uric acid.</li> <li>3. Urea.</li> </ol> <p><i>c.</i> From uric acid:</p> <ol style="list-style-type: none"> <li>1. Urea.</li> <li>2. Allantoin.</li> </ol> <p><i>d.</i> From glycine:</p> <p>Urea.</p> <p><i>e.</i> From theine:</p> <p>Urea.</p> <p><i>f.</i> From glycerine:</p> <ol style="list-style-type: none"> <li>1. Sugar.</li> <li>2. Lactic acid.</li> </ol> <p><i>g.</i> From inosite:</p> <p>Lactic acid.</p> <p><i>h.</i> From lactate of lime:</p> <p>Carbonate of lime and water.</p> | <p><i>i.</i> From formiate of lime:</p> <p>Carbonate of lime and water.</p> <p><i>k.</i> From acetate of lime:</p> <p>Carbonate of lime and water.</p> <p><i>l.</i> From butyrate of lime.:</p> <p>Carbonate of lime and water.</p> <p><i>m.</i> From tartrate of lime:</p> <p>Carbonate and oxalate of lime.</p> <p><i>n.</i> From gum (containing lime and muric acid:)</p> <p>Carbonate and oxalate of lime and water.</p> <p><i>o.</i> From mannite:</p> <p>Sugar.</p> <p><i>p.</i> From amygdalin:</p> <ol style="list-style-type: none"> <li>1. Sugar.</li> <li>2. Hydrocyanic acid.</li> <li>3. Oleum amygdalum æthereum (probably.)</li> </ol> <p><i>q.</i> From tannic acid:</p> <p>Sugar and gallic acid.</p> <p><i>r.</i> From salicin:</p> <p>Sugar and saligenin or saliretin</p> |
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Electricity exerted no action upon starch, dextrin, glycogen, and sugar.

By the action of ozone were obtained—

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| <p><i>a.</i> From uric acid:</p> <ol style="list-style-type: none"> <li>1. Urea.</li> <li>2. Allantoin.</li> </ol> <p><i>b.</i> From glycine:</p> <p>Urea.</p> | <p><i>c.</i> From glycerine:</p> <p>Sugar, and most probably lactic acid.</p> <p><i>d.</i> From mannite:</p> <p>Sugar.</p> |
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Ozone appears to have no action upon starch.

By the action of nitric acid, aided by heat, are obtained—

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|-----------------------------------|--------------------------|
| a. From starch : sugar.           | c. From mannite : sugar. |
| b. From corpora amylacea : sugar. | d. From gum : sugar.     |

The fresh pancreas of a dog, whether the reaction was acid or not, yielded—

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| a. From butter : fatty acids, glycerin<br>and sugar. | b. From glycerine : sugar. It exerted<br>no action upon glycin. |
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The liver of the calf at 32° R. converted—

- |                                      |                    |
|--------------------------------------|--------------------|
| a. Glycerin into glycogen and sugar. | b. Starch : sugar. |
|--------------------------------------|--------------------|

At common temperatures, it converted dextrin into sugar. It exerted no action upon glycin.

### TANNIN AS AN ANTIDOTE TO STRYCHNIA.

PROF. KURZAK gives the following results of experiments made by him upon rabbits and dogs, in which tannin was administered as the antidote to strychnia. He says that when administered in proper time, tannin is an excellent antidote, and the favourable results produced by the experiments on rabbits and dogs give every hope of analogous results upon man.

It is necessary that the dose of tannin be from twenty to twenty-five times that of the strychnia which has been taken; and in cases of poisoning, it would even be prudent to make the dose of tannin much stronger still.

The powder can be immediately employed and obtained by pulverizing nut-galls, and then making an infusion of this latter substance.

An infusion of black-tea may be useful when the dose of strychnia is not very great; coffee also possesses the same properties, but in a less degree than tea.

The bark of the oak, which contains 8.5 in 100 of tannic acid, may be rendered serviceable by the facility with which it can be procured; it is also employed pulverized, or in decoctions similar to that of nut-galls.

The author mentions besides, acorns, the bark of the chesnut-tree and the willow, the skins of nuts, the root of tormentil, pinks, and snakeweed as rich in tannin.

It is important to avoid the use of vegetable acids whilst administering tannin, on account of the solubility in these acids of the precipitate produced by the tannin in the solutions of strychnia. It is the same with alcoholic drinks. In fact, it is important to avoid every kind of voluntary movement, and all excitement, of whatever nature it may be, these influences being capable of producing spasmodic contractions.—*B. and F. Med-Chir. Rev.*, Oct. 1862, from *Zeitschrift der k. k. Gesellschaft der Aerzte zu Wien*, 1862.

### INTERNATIONAL CONGRESS OF VETERINARY SURGEONS.

WE are happy to inform our readers that, just as the last sheet is going to press, we have received an official letter, announcing that the Senate of Hamburgh has granted permission for the holding of the meetings of the International Congress in the Hall of the Public Gymnasium. This recognition of the Congress by the Hamburgh authorities must tend to secure success.



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### ORIGINAL COMMUNICATIONS AND CASES.

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*On Clysters and their Indispensable Requirement in Veterinary Practice.* By Professor GAMGEE, Sen., New Veterinary College, Edinburgh.

THE good effects which experience has shown to be derivable from proper and timely use of clysters, for the relief of the most valuable of the veterinary surgeon's patients, have been set forth from time to time in the pages of this *Review*.

This therapeutic means, whilst one of the oldest on record for the cure of animals, has been approved of in all times and all countries, without, so far as we have seen, any objections to it being urged; still the enema has not been appreciated in this country in any measure proportionate to its importance.

In this place I purpose making some statements concerning the abstract merits of clysters—when they should be used, and how best to apply them, and how to have them most readily available.

There is more than one good reason for treating this question analytically. Firstly, when we have proved the all-sufficient efficacy of one agent, it is seldom right to risk on chance the effect of another. On the other hand, if we see that the co-operation of a second, or several agencies tending in the same direction, be indicated, we use them; usually one, or at most two, of these will be found of the first order of importance, and the others accessories, which come under the class of hygienic supports; in a large proportion of the cases which come under our care in the treatment of horses, we find clysters of the first and chief value; many cases which can be restored speedily by their use alone, would run on to complications, or terminate fatally, though all the drugs enumerated in the pharmacopœia were at hand, unless this first relieving agent was had recourse to in the early stage.

In veterinary practice, we have even more requirement for the

enema than the practitioner of human medicine. In the first place, many of our patients do not vomit spontaneously, however much the stomach may be overcharged; in none have we so many effectual means at our disposal to calm and unload the system as the physician has; through the known operation of medicine on the human subject, the influence of placing the patient in bed, and the action that can be thereby produced on the skin, all affording means in greater variety to restore the equilibrium of the system than are at the command of the veterinary practitioner.

On principle, the physician and veterinarian can proceed for the attainment of similar ends by different means. It is needless to enumerate the every-day occurring cases in which clysters are required in the treatment of horses, cattle, and all other animals which come under our care. We have frequently shown the use of clysters in cases of stomach and bowel disorders; in those of colic especially, though these form a small proportion only of the cases which require the adoption of the same means. The horse, in his artificial state, is very subject to derangement of the digestive system, and whether the stomach and bowels be primarily affected, or the sequel of some other derangement, their condition always becomes a leading feature in the required restorative treatment.

In the cure of disease, it is most essential that the right thing be done at the right time. An enema is, in a large proportion of cases, the first thing that is required, whilst appropriate coadjutant medical agents should follow. As an example, a gentleman's coachman hastens to us, and says that his master's valuable young saddle-horse is ill. On reaching the stable, we observe the horse standing with the evident signs of ill health, with his back arched, his coat staring, his breathing accelerated, and on going up to the animal, it is found that his extremities are cold, the skin dry, pulse small, and indistinct. On inquiry as to when the horse was first observed to be unwell, the answer was—on that morning, six hours before we saw him, when he refused his food. We then asked whether he had lain down in the course of the night, and was answered in the affirmative, adding that from the appearance of the litter, he had been pawing during the night and morning. On further inquiring as to when the patient was seen to evacuate, and what had been observed as to the state of the fæces, we learned that nothing had been seen for some time past. A clyster was then administered, and a few minutes after was expelled, with three or four small hard pellets, coated with dense mucus. Waiting a few minutes longer, we repeated the clyster, and gave 5 drachms of Cape aloes. Beyond taking away all food from the horse, and ordering his manger to be swept clean, nothing was done for an hour and a half, when, returning, it was found that a more copious discharge of fæces had taken place, and the appearance of the horse, the feel of his skin, and the state of the pulse, all afforded greatly improved signs. One or two more clysters were given, at intervals of two hours during the afternoon and evening, and the relief and



cure went on without interruption, when, on the morrow, the animal was thoroughly relieved ; strictness to diet, and comfort to the animal in every way enjoined, were the accessories used in the case.

This is a case where I look on the clyster to have done everything, and nothing was certain to have succeeded so well without it. The horse was relieved during the first 20 minutes from the time we saw him, and the sympathetic good effects were soon apparent over the whole system.

Whilst long practice, with observation, teaches how to value the symptoms collectively, in cases in which the stomach and bowels are implicated, the state of the pulse and respiratory system should not so much arrest attention as to draw it from the real state—the redness of the conjunctiva, and that of the lining membrane of the nostrils, are symptoms commonly of secondary effects, due to first causes : by removing the one, the other ceases—as, if a man's finger was in a vice, it would not be rational to wait, observing his countenance and feeling his pulse, but, on the contrary, to remove the cause of disturbance with all speed.

No one denies the efficacy of clysters, and yet we know of no other agent so generally approved, and at the same time so insufficiently and ineffectually employed ; as veterinary practitioners, we have none of the motives which often disincline the physician from prescribing an enema in the early stages of disorders, whilst, as already said, we lack some of the other means comparatively easy at command in human medicine.

One great hindrance to clysters being promptly used in veterinary practice, consists in the want of a proper instrument for the purpose being at hand when required. A practitioner is called a distance from home to see a patient, and takes with him some variety of medicinal agents, from which selection is made ; but nothing is said about a clyster, because no means are ready for that purpose, or it is put off till next visit ; which putting off and late execution of the means of relief greatly diminish the chances of a good result.

A few years ago I endeavoured to supply a want, when I showed the results I had obtained, which were largely due to the employment of clysters, and at the same time I exhibited the instrument for the purpose of administering them, which experience had convinced me was superior to any other then in use in veterinary practice. Though then, in 1855, I spoke of the enema funnel, from personal experience of its good effects in relieving the horse, the animal in which I had then used it, and, as was anticipated, it has been since found no less effective for the relief of cattle and other animals ; and after many trials, prosecuted over a period of several years, made on different animals for the purpose, I have been able to reduce the instrument to a scale adapting it to all patients, from horses and cattle to the smallest pet dog.

No claim to originality of invention was advanced when I first introduced the enema funnel to public notice, or has ever been. I had

accidentally seen a solitary specimen, the use of which I obtained, and the permission to copy it ; yet, it was so little known, that I had not seen it at any of the veterinary establishments, the chief of which I had visited, and was well acquainted with many eminent practitioners in Europe and of the means they adopted for the administration of clysters.

It was not until after I came to Edinburgh, six years ago, that I saw a funnel clyster tube in the possession of Major James Hunter of Thurston, and I learnt from that gentleman something of its history which interested me. Major Hunter informed me, that whilst in the service some twenty-five years ago, the veterinary surgeon of the regiment, the 7th Dragoon Guards, a German, used the funnel, after which that which Major Hunter then possessed was made, and which he had since always adopted for his horses and cattle on his extensive farms in East Lothian.

Within the last year I have further learned through my son, Professor John Gamgee, that when visiting the veterinary establishments of Holland last year, the funnel clyster tube was in use at the Veterinary School at Utrecht, and has been the only one adopted there within the knowledge of the teachers of the present time ; it therefore, now appears that if I have any claim, it is not that of inventor, but only such as attaches to my having understood its worth, and by publishing and exhibiting it, besides adjusting it after trial, so as to generalize its utility. These are the little matters which belong to my part, and the real cause of surprise is, that such an instrument should have existed for a generation at least, and be only locally, and to a very small extent, known.

An instrument so commonly required, as is that for the administration of clysters, should be always ready where stock are kept ; and as well as being the most effective in kind, it should be convenient in form and moderate in price ; if, instead of a little handy one, a great ill-suited engine, at considerable cost, can only be found, these faults will make it scarce, and *vice versa*.

After exhibiting the enema funnel to the members of the profession, in the winter of 1855-56, I handed it to an instrument maker, allowed it to be copied and used as a model, and, strange as it is to understand, the original was sacrificed to other forms, suggested by persons who had never used the instrument, and who had no correct appreciation of its special merits. The result was, that those offered to me, as made, and—as the makers said—after my own, were so unlike what was wanted that I considered them unfit for the purpose. I then proceeded, by superintending the execution, and making trials to reduce, as before said, the different sizes of the enema funnel to a suitable scale, so that the possibility of the principle being lost before it could be made generally known was no longer felt. Thus, after delay of some time, including that necessarily taken to perfect the different sizes required for the variety of animals, Mr Benjamin Latchford, bridle-bit maker, &c., to the Queen and the Army, of



No. 11, Upper St Martin's Lane, London, W.C., will make these funnel enema tubes with the greatest nicety ; so that, whilst writing on the efficiency of clysters, the proper instrument for their administration is placed at the command of the public and the profession. Clysters more especially should not be neglected in the treatment of foals and calves ; their disorders are commonly due to stomach and bowel derangements, and the young animals seldom recover from acute derangement where much medicine is given, and the safest and most effectual means omitted.

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*Impaction of the Single Colon.* By D. C. EMMOTT, M.R.C.V.S.,  
Keighley, Yorkshire.

ON May 1st, 1862, at 7 P.M., I was summoned to attend a grey pony, 13 hands high, belonging to a greengrocer in this town, which was observed to be uneasy, showing symptoms of abdominal pain. On my arrival I found the pony restless, lying down, and quickly rising again, looking back at the abdomen, pulse regular, belly tympanitic, the respiration slightly accelerated, and had passed no fæces since morning; gave the following draught:—

R̄ Aloes Bbds.,	.	℥iv.
Spt. nit. eth.,	.	℥j.
Aq. tepida,	.	℥viii.

Enemata were also directed to be thrown up every half hour.

12 P.M.—The symptoms unchanged, the injections returned as transparent as before being given, which consisted simply of tepid water; gave—

R̄ Spt. nit. eth.,	.	℥j.
Spt. ammon. co.,	.	℥j.
Aq. frigus,	.	Oj.

and ordered the injections to be continued as before.

2nd. 4 A.M.—The symptoms in no way mitigated; administered—

R̄ Aloes Bbds.,	.	℥ij., in bolus,
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and the injections to be given every hour.

10 A.M.—The patient is much in *statu quo*, with the exception of having longer intervals of ease, when in the recumbent position; the abdomen still tympanitic, with frequent rumblings, but no evacuation of fæces; gave—

R̄ Aloes Bbds.,	.	℥ij., in bolus.
Et. liq. ammon.,	.	℥ss.
Aq. frig.,	.	Oj., in haustus.

The injections containing oil to be persevered in.

3 P.M.—The symptoms indicate greater suffering, from his frequently looking back towards his flank, the abdomen more distended, the legs and ears below the natural temperature; believes he has

micturated, but the bowels have not responded. Ordered the belly to be fomented with cloths dipped in hot water, and continue for some hours, still continue the injections, and gave—

R Aloes, Bbds.,	.	3iv.
Spt. nit. eth.,	.	3ij.
Spt. ammon. co.,	.	3j.
Aquæ,	.	q.s.

I have now some doubts my patient will not recover, as every means we have adopted seems in no way to ameliorate the symptoms, but, on the contrary, he grows worse.

7 P.M.—Again visited him, the symptoms unmitigated, no evacuation of fæces. Continue the injections.

10 P.M.—On going to the stable I heard him very uneasy with efforts at vomition. On reaching the door I was informed he had just risen and commenced to walk round the place in which he was loose, retches frequently, but nothing is ejected; he now fell, and died without a struggle.

*Post-mortem examination 13 hours after death.*—On opening the abdomen the intestines burst forth with violence owing to their being much inflated with gas. The contents of the stomach and intestines in a semi-fluid state, and nothing abnormal was observed till we reached the single colon; here apparently lay the mischief; the whole of this division of the colon was firmly impacted with masticated beans and bran, and so dry and hard that any one might almost have believed it had been baked in the oven; this part of the intestine was also spasmodically contracted upon its contents.

In conclusion, I think it necessary to state, that the pony had only been in the present owner's possession about a month; it had previously been hardly dealt with; and, singular to say, its present owner never gave it any hay, but fed it exclusively on bran and split beans. I was told the pony had run away about a week before, being taken ill, and, in consequence of this mishap, it had been allowed to remain idle in the stable, and have its usual allowance of provender.

On the morning of the day it was taken ill, the food was refused, yet it was taken a journey of ten or twelve miles, and was noticed to evacuate fæces twice.

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*Health of Stock.* By JOHN GAMGEE, Principal of the New Veterinary College, Edinburgh.

ENGLAND.

(Omitted last month.)

**NORFOLK.**—JOHN BETTS, Docking, Lynn.—Pleuro-pneumonia in cattle, and the foot-and-mouth disease very prevalent. A few cases of black quarter, splenic apoplexy, parturient fever, and red water



occurred. Murrain and flux were the most frequent diseases of sheep; pneumonia, that of pigs. An average of disease among horses.

“I have known several dogs to die from eating the flesh of animals that had died from inflammatory or putrid fever.”

#### WALES.

**DENBIGH.**—**JOHN EDWARDS, Abergele.**—This district is remarkably free from pleuro-pneumonia; the foot-and-mouth disease has occurred to a limited extent from contagion. Two lots were infected in the train when conveyed from Scotland; they were quite free when bought, but showed the disease about seven days after delivery to their respective owners. Other three lots were infected from diseased cattle bought at a fair. Black quarter generally appears from May to November to a limited extent; red water and parturient fever also. There has been great mortality amongst sheep rather out of my district. Sore throat, aphtha, gastro-enteritis (from the poison of brine), have been prevalent amongst pigs. I have seen no instances of persons suffering from eating diseased meat, the reason being that it is all taken to Liverpool, to a much greater extent than the authorities ever think of. Among horses, influenza pharyngo-laryngitis has averaged 25 per cent. Affections of the digestive organs have been unusually few, the proportion of cases being below that of preceding years.

Glanders appeared on a farm from a mare bought at a fair. Six horses were destroyed; one young man, a carter, was infected, and died a most loathsome and pitiful object. Another mare (glandered), belonging to a farmer, was sold in a fair after she was condemned by me, and no doubt she will spread the disease. I did not think it my duty to interfere as long as the legislature is heedless of such things. The quantity of diseased meat that is taken to Liverpool from this district is vast; of course I could not prove this legally, but morally there is not a doubt about the fact. Cattle also, under the effects of medicine, are sold to the butchers. The farmer generally presses for our prognosis, and in the majority of cases when unfavourable, in spite of caution as to the dangerous quality of the flesh, the butcher is sent for, and he generally disappears with it.

**JOSEPH MULLINER, Wrexham.**—Pleuro-pneumonia has been raging in this neighbourhood for the last twenty years. Cattle in good condition are immediately slaughtered, but there are some scores of milking cows, which recovered a year or two ago, now doing well. The foot-and-mouth disease in cattle was very much in this neighbourhood about twenty-one years ago, and last year visited us again. Several cows have lost their hoofs, and some that were neglected have died; the disease was brought here this time by cows bought at distant fairs. There has been the average amount of black quarter in young stock. Several cases of parturient fever have occurred in well-fed cows, and a great many cases of abortion in their stocks. Red water often occurs when cows are first put up to feed on turnips, but

soon recover with proper treatment. Rot, scab, and foot-rot have principally prevailed among sheep.

There has been this last year or two a great many heifers on the banks of the Dee affected with disease of the eyes, as described by Mr Cartwright in your January number of the *Veterinary Review*, and there are more on the meadow farms. Many young calves suffer from bronchitis; they are attacked shortly after birth, and only live a few days.

Among horses affections of the digestive organs have been very common, owing to change in the mode of feeding, giving little or no hay, and more manger stuffs. Affections of the respiratory organs have not been so common. Influenza, accompanied with laminitis, has occurred in some instances.

"I recollect about twenty-five years ago, several families in Ellesmere, Salop, suffered from the mouth distemper, owing to their having used the milk of cows so distempered."

**GLAMORGANSHIRE.**—GEORGE BODINGTON, Cauton, Cardiff.—There have been a few isolated cases of pleuro-pneumonia of the mildest character. The foot-and-mouth disease in cattle and sheep has raged fearfully throughout the whole county of Glamorgan, but few herds have escaped. Pigs also have suffered much: but I have not known a case to terminate fatally. Red water is to be found in certain districts of this county at all times, in all seasons, and in those particular districts has largely prevailed during the last year. Several cases of splenic apoplexy have come under my notice, and in pigs it has been particularly prevalent. Among sheep 'foot-rot' has prevailed to an alarming extent, and in many instances whole flocks have been sacrificed by 'rot,' or, as it is called here, 'baning.' Among pigs, besides the foot-and-mouth disease, typhus has prevailed.

Among horses both glanders and farcy have been somewhat prevalent, and also pleurisy. Influenza of a rather peculiar type has also largely prevailed, having an unusual tendency to become glanderous, the ordinary symptoms of catarrh are not present; but gleet, with extraordinary glandular affections and great prostration, are generally observable in the course of a few hours from the commencement; cough is seldom present. I attribute it to wet, and west winds which have been so prevalent.

THOMAS WHAPHAM, Taibach.—The foot-and-mouth disease was very prevalent during the winter, but it seems at present to be abating, and is attributable to the importation of diseased stock from affected districts. Among sheep flukes in the liver and diseased lungs have prevailed.

My practice is chiefly confined to horses. I have had four cases of glanders in the course of 18 months among colliery horses under ground. About three years ago, I had several cases of hydrophobia all on one farm; all classes of animals were affected, from the horse to the fowl. Catarrh has prevailed extensively among horses, also pneumonia to some extent, and colic from various causes. Otherwise,



injuries of various kinds, fractures, wounds, quittor, and various lamenesses, are the most usual run of cases.

**MONMOUTHSHIRE.**—THOMAS WILKES, Newport.—In July, the foot-and-mouth disease was brought into this district by an infected animal from Scotland, and prevailed during July and August, and then ceased. In December the disease was brought by an animal from London, but I am of opinion that it caught the complaint in the railway truck, as at that time Irish cattle with the disease were frequently carried by the South Wales Railway, and the disease has prevailed in this district ever since. As a sequel to the disease, the udders of several milch cows became severely affected, resulting in abscesses and atrophy of one portion of the glandular structure. Pigs have also been affected with the disease. During the past three years the rot has prevailed to a great extent among sheep and young cattle, to be attributed to the continuance of wet weather; on some farms the whole stock has been swept away.

Of horses, except that influenza prevailed during January and February, there is nothing particular to record.

Owing to complaints among the farmers, and at the suggestion of the Medical Officer of Health for the town (Dr Davis), I have been lately appointed to inspect all animals brought for sale to our cattle market, and have had to interfere in several instances of epizootic aphtha both in cows and pigs.

#### ISLE OF MAN.

JOHN FAICHNEY, Douglas.—Although no cases of pleuro-pneumonia in cattle have occurred in the last twelve months, in the months of November and December cattle suffered greatly from foot-and-mouth disease, communicated by cattle imported from Ireland. There have also been a few cases of black quarter in year-olds; splenic apoplexy, parturient fever in cows, and red water in cattle badly fed on damp pastures. Among sheep, brain affections, pneumonia, and fluxes in the liver have been the most common complaints. Many horses have suffered from influenza and other affections of the respiratory organs. Affections of the digestive organs have also been numerous.

#### SCOTLAND.

**ABERDEENSHIRE.**—GEORGE BARRON, Mill of Collierlie, Echt, reports a number of cases of pleuro-pneumonia in cattle, and “that many on the first appearance of the disease were sent to be slaughtered, which I did not attend.” The foot-and-mouth disease had occurred to a considerable extent; due to “contagion, and in all cases had been introduced with stock from the south—by English and Ayrshire cows and calves.” Black quarter and parturient fever have occurred in a few cases; red water and stomach staggers to a much greater extent. Among sheep, sturdy, braxy, foot-rot, and a form of ophthalmia, have prevailed. Measles, and itch or mange,

and an occasional case of apoplexy, among pigs. Influenza, and other affections of the respiratory organs, also affections of the digestive organs, prevailed to a considerable extent among horses. He mentions also two cases of glanders, two of purpura hæmorrhagica, and a number of weed, as occurring.

GEORGE BEATTIE, Langside, by Mintlaw.—Pleuro-pneumonia has disappeared from the district during the last six months, but was prevalent in the summer of 1861. The foot-and-mouth disease has been very prevalent for the last six months, especially among large stocks. They are attributed “exclusively to infection and contagion.” In the spring and autumn, quarter-ill usually appears; but, I think, is on the decline. During the last season and the present, have had more than the usual number of cases of parturient fever, but still the number is small. Excepting in calves, when weaned, red water is rare among young cattle; but puerperal red water in cows occurs to a great extent in some years. I have never known a case of splenic apoplexy, but in the months of May and June we generally have some cases of lead poisoning. In sheep, foot-rot has prevailed greatly, and sturdy or hydatids where the flocks were much exposed.

Amongst horses, affections of the respiratory organs have prevailed greatly of late, so that very few animals have entirely escaped suffering to some extent. Affections of the digestive organs are somewhat common on change of food—weed is of frequent occurrence, and a case of purpura hæmorrhagica occasionally occurs.

GEORGE DAWSON, Strathdon, by Inverkindie.—No pleuro-pneumonia. Had fifty or sixty cases of foot-and-mouth disease, caused by a drove of diseased cattle that passed through the district in November last. Had very few cases of black quarter, owing to the use of preventive measures; a few cases of splenic apoplexy, all of which were fatal; and a few cases of parturient fever. Red water is very prevalent in this district, but death from it rare. Sturdy in sheep has prevailed to a considerable extent. Among horses, catarrh, sore throat, and strangles, have been more prevalent than usual. Affections of the digestive organs are always common in this district.

A. DUNCAN, Methlick.—No pleuro-pneumonia. A few farms have been visited by foot-and-mouth disease—cause, contagion; and a few farmers have suffered severely from black quarter. Parturient fever and red water occurred in a few cases. Foot-rot has occurred to a great extent amongst sheep. The average amount of disease has occurred among horses.

THOMAS HAY, Ellon.—No cases of contagious or infectious pleuro-pneumonia, though chest diseases, such as phthisis, &c., are numerous. Foot-and-mouth disease has prevailed to a very great extent, and in all cases easily traced to contagion. Black quarter occurs at all seasons, but is most common in spring and autumn. Some herds, where it used to be very common, are now quite free, owing to the adoption of preventive measures. Parturient fever very common among dairy cows. “Red water rarely occurs in well-bred cows, is



peculiarly the cottar's cow's disease, and in some years is very prevalent." Glossanthrax is very common in the district, and a few cases of cow-pox occurred. Among horses affections of the respiratory organs have not been very prevalent. More horses are lost by inflammation of the bowels than all other diseases put together.

WILLIAM HENDERSON, Seggieden, Kinnethmont.—No pleuro-pneumonia, but the foot-and-mouth disease has been very prevalent, brought to the district by affected animals. Few cases of black quarter come under notice since preventive means have been adopted. Last year there were few cases of parturient fever; some years, however, it rages terribly. Four cases of splenic apoplexy occurred. Red water is the scourge of the dairy here; and, although but a small per-centage of animals attacked die, they become emaciated and almost useless for the season. Among horses, catarrh was common during last autumn; a few cases of strangles, &c.; but, on the whole, a moderate amount of disease.

JOHN MASSON, Kintore.—A great many cases of pleuro-pneumonia, all of which could be traced to contagion. The foot-and-mouth disease common at the fall of the year, due to contagion. Neither black quarter nor red water, very prevalent. A few cases of cow-pox occurred. Several cases of glossanthrax, all of which proved fatal. Among horses, influenza, catarrh, bronchitis, and strangles were very prevalent from September to the present January, and some cases of derangement of digestive organs, owing to change of food.

THOMAS MELLIS, Inverury.—No cases of pleuro-pneumonia, but the foot-and-mouth disease so common, "that I may say it has not missed a single hoof in this locality; for all the cattle have been more or less affected, so far as I can learn." It was supposed to arise from a drove of cattle which came to a market here. Had a few cases of black quarter and parturient fever. Parturient red water more common. A few cases of cow-pox occurred. Foot-rot and itch chiefly prevailed among sheep and pigs. Among horses, common cold and strangles in great numbers. A few cases of influenza and other affections of the respiratory organs; affections of the digestive organs common, especially colic. A considerable number of cases of weed occurred, and a few cases of mange. "I know a farmer near this whose horses became affected with foot-and-mouth disease from drinking out of the pails used for watering the cattle."

WILLIAM M. REID, Leochel-Cushnie.—Pleuro-pneumonia I believe solely due to infection or contagion; but no cases have occurred in this district during the year. Foot-and-mouth disease prevailed to a great extent throughout the autumn and winter, and several cases of cow-pox occurred during the summer. Black quarter, parturient fever, and red water prevailed to some extent. Among sheep occurred principally sturdy, foot-rot, braxy, &c. Among pigs, rheumatism, milk fever in sows, &c. Affections of the digestive organs were of frequent occurrence among horses.

JAMES WILSON, Keig, Whitehouse.—Foot-and-mouth disease oc-



curred to a slight extent in cattle, caused by shifting diseased beasts from one district to another. A few cases of cow-pox occurred, and black quarter, splenic apoplexy, parturient fever, and red water to a slight extent. Among sheep, the foot-and-mouth disease has principally prevailed, but only to a moderate extent. Affections of the respiratory organs have prevailed greatly among horses; other diseases only to a slight extent.

**GEORGE ROBERTSON**, Dudwick, by Ellon.—No pleuro-pneumonia during the year. The foot-and-mouth disease has been very prevalent among fat cattle, cows, and calves, “due to the all-potent cause, contagion.” Black quarter is very much on the decrease. A great number of cases of parturient fever occurred in the months of June, July, and August. “Pigs, when they appear to be diseased, are killed and sent off to market.” Horses have been extremely free from diseases of the respiratory organs during the year; affections of the digestive organs have been more common.

“I have heard of one or two individuals being infected by the foot-and-mouth disease in the Formartine district.”

**AYRSHIRE**.—**JOHN MUNN**, Cumnock.—This locality has been clear from pleuro-pneumonia, with the exception of one stock. The foot-and-mouth disease prevailed to a great extent during last year. “They are due to contagion.” Black quarter and parturient fever have prevailed to a moderate extent. Amongst sheep, rot, caused by the flukeworm, has been most prevalent. Measles and pericarditis most common in pigs. Horses, last summer, suffered to a large extent from affections of the respiratory organs, and to a moderate extent from affections of the digestive organs.

**BANFFSHIRE**.—**WM. GORDON**, Tomintoul, Ballindalloch.—Pleuro-pneumonia in cattle has not been known in this place, except at one farm, the owner of which makes his purchases of stock here and there at any market; and cases have in every instance been traced to cattle purchased at fairs and markets. Concerning the diseases of quarter-ill and splenic apoplexy I have not seen a single case, though quarter-ill was very prevalent some years ago. Parturient fever is not very prevalent. Red water has occurred chiefly in cows after calving, but is not so common a disease as it used to be. The principal diseases among sheep have been foot-rot, foot-and-mouth disease, fluke-rot, sturdy and braxy. Very few pigs are kept in the district, and, if attacked by any ailment, are allowed to take their chance. Horses have suffered affections of the respiratory organs to a considerable extent, and in every form, from simple catarrh to obstinate typhoid pneumonia. Affections of the digestive organs have been very prevalent. A number of cases of strangles have occurred, but only one case of purpura hæmorrhagica.

“I may here remark, that the foot-and-mouth disease was communicated to the sheep of a farmer in this county by tups or rams brought from the south of Scotland; they had been purchased at a public market. About the same time it was communicated to our



cattle by animals brought from the Muir of Ord market; they were driven through this country going to Hallow Fair, Edinburgh. As a rule, this is a very healthy neighbourhood. We seldom see any cattle not bred in the district, except droves passing from the north country markets to the south, and if we did not see strange cattle, we should never see contagious diseases."

**WILLIAM MUNRO, Keith.**—A few cases of pleuro-pneumonia, but many more cases of foot-and-mouth disease have occurred; they are due to contagion. Only a few cases of black quarter occurred; but there were many of red water. Horses have suffered a good deal from catarrh, and somewhat from influenza. There has also been a good deal of stomach staggers and chronic indigestion.

**BERWICKSHIRE.**—**JOHN LIDDLE, Reston.**—Several cases of pleuro-pneumonia occurred in this district, and mostly every farm had more or less of the foot-and-mouth disease this year. "All can be traced to contagion, either from mixing with stock diseased, or travelling where they have travelled." There has been a good deal of black quarter in this district, and parturient fever was very prevalent last May; a few cases of red water occur now and then after parturition; of cow-pox, two cases within the year. Horses have suffered from influenza, accompanied with great general debility, but little of other disease has occurred.

**WILLIAM LOTHIAN, Dunse.**—Pleuro-pneumonia has been very prevalent, both among dairy stock and store cattle; the foot-and-mouth disease was very extensively spread, especially during the month of October, commonly ascribed to infection and contagion. Black quarter occurred to a small extent, and the amount of parturient fever has not been great. Among pigs, I have seen epizootic aphtha, epilepsy, and a considerable amount of pneumonia, or rather pleuro-pneumonia, as both lungs and pleura were affected. Horses have suffered more from affections of the respiratory organs than in former years, but less from affections of the digestive organs.

"I think I have never seen epizootic aphtha so widely and uniformly spread as it was last year, neither have I seen it so disastrous."

**CAITHNESS.**—**GEORGE DUNDAS, Lochshell, Wick.**—Generally speaking, the farmers of the county confine themselves to the breeding and rearing of cattle, and are mostly exempt from contagious diseases; the cattle on one farm in the district had foot-and-mouth disease. Black quarter occurs frequently, and there are a good many cases of parturient fever among the cows of the poorer classes; red water is also very prevalent after calving. A good many lambs died from grass sickness. Horses have suffered chiefly from derangement of the digestive organs.

**DUMFRIES-SHIRE.**—**JOHN GILLESPIE, Dumfries.**—Pleuro-pneumonia has prevailed to a great extent in all kinds of cattle; has been most fatal, however, to Highland stock; few farms have been exempt from the foot-and-mouth disease either in sheep or cattle, although

the deaths are very few. Black quarter sometimes occurs in young cattle, parturient fever in cows is not very prevalent, and red water rare. This season, rot has been prevailing to a very great extent among sheep, said to be owing to so much wet weather. Cases of affections of the respiratory organs have been very numerous among horses, affections of the digestive organs not so numerous.

**CHARLES LAUDER, Dumfries.**—Pleuro-pneumonia in cattle is on the decline; a considerable number of cases occur, but it does not sweep off whole stocks as it once did; foot-and-mouth disease has been very common in cattle, and, though not fatal, is attended with great loss of condition, and in severe cases cows have an almost total suspension of milk. Black quarter is much less frequent than it used to be, parturient fever is pretty common, but red water scarcely known in the district. In sheep the prevailing disease is rot or fluke in the biliary ducts; it is very prevalent in Dumfries. Catarrhal affections have been numerous among horses; there has been about the average number of affections of the digestive organs.

**FIFE.**—**ARCHIBALD DUNCAN, Colinsburgh.**—Pleuro-pneumonia in cattle is not so prevalent as it once was; the foot-and-mouth disease is more prevalent than it has been for many years. The general opinion is, they are caused by contagion. A number of cases of black quarter have occurred, more than for some years back. Splenic apoplexy was rather prevalent last summer; a few cases of parturient fever, and the average number of cases of red water occurred. The foot-and-mouth disease in sheep, and measles in pigs, have been their most common complaints.

Catarrh and influenza have been very prevalent during the winter among horses, affections of the digestive organs rather numerous, and there have occurred a good number of cases of weed.

**JOHN MORRIS, Torryburn, Dunfermline.**—A few cases of pleuro-pneumonia occur now and then among cattle; the foot-and-mouth disease was very prevalent after Hallow Fair, being brought in by cattle purchased there. Very few cases of black quarter occur in this district; there have been a few cases of red water, and last year a great number of cows died from parturient fever. Catarrh and influenza, also indigestion and colic, have prevailed to a considerable extent among horses.

**FORFARSHIRE.**—**WILLIAM BAXTER, Dundee.**—Pleuro-pneumonia in cattle has been very prevalent, and so also has the foot-and-mouth disease. A few cases of black quarter occurred, but it is not a common disease in this neighbourhood, also a few cases of splenic apoplexy, parturient fever, and red water. Among horses, influenza and pneumonia have been very prevalent, more especially the former complaint; affections of the digestive organs have also been very common.

**JAMES BELL, Inverkeillor.**—Pleuro-pneumonia in cattle has prevailed to a great extent, and the foot-and-mouth disease has affected both cattle and sheep over nearly the whole district. Pleuro-



pneumonia is generally attributed to the young cattle brought from the south; the same may be said of the foot-and-mouth disease; as a proof of this I may state, that almost without exception the farmers in this district who bought cattle at the last Falkirk Tryst had their whole stock afterwards more or less affected by it. Black quarter is very prevalent on many farms. Red water is very common. Parturient fever not very general. In sheep, rot not very prevalent; foot-and-mouth disease very common, and sturdy among young sheep very prevalent. In pigs a few cases of measles. Affections of the digestive organs among horses very numerous.

“As to pleuro-pneumonia I may say that the importing of cattle from southern markets has a great tendency to bring and spread the disease among stock hitherto not at all infected, very great risk is thus run by purchasers. Two small Ayrshire cows were lately brought from Glasgow market, and they fell respectively into the hands of two farmers in this district. Shortly after receiving them it was found on both farms that the other and hitherto uninfected stock were all attacked with this disease. I consider it unjust and very injurious to cattle, to place them in unwashed railway trucks among the droppings and saliva of probably diseased animals. I would suggest that railway companies be bound to clean out and wash with quicklime the trucks at all times on cattle being removed.

JAMES COWIE, Montrose. — Pleuro-pneumonia was prevalent. Foot-and-mouth disease only partially so. Infection the cause assigned. Black quarter not very prevalent. Parturient fever very rare. Red water, of which there are not many cases, occurs in cows principally, and is rarely fatal. Among horses, colic is the principal affection. Other diseases scarcely worth noting.

DAVID EWEN, Barry, by Carnoustie. — Pleuro-pneumonia in cattle to a small extent. A considerable amount of foot-and-mouth disease, and a few cases of cow-pox, attributable to contagion. No cases of black quarter have occurred. A few cases of splenic apoplexy, parturient fever, and red water. A few cases of glossanthrax have also occurred. Among horses, there has been a considerable number of cases of affections of both the respiratory and digestive organs.

JOHN FAIRLEY, Glamis. — Except on one farm, only a few cases of pleuro-pneumonia. Not a farm in my district has escaped the foot-and-mouth disease. A great number of grazing cattle, many of which were diseased, were purchased by our farmers in Falkirk Tryst, and afterwards the disease spread rapidly all over the district. Black quarter not so prevalent as in former years, nor other cattle diseases common. Rot, foot-and-mouth disease, and inflammation of the lungs, most prevalent diseases of sheep. Only the usual run of diseases occurred in horses. “In my district both cattle and horses have been in better health than in some previous years, excepting only the foot-and-mouth disease. I have known whole herds of sheep for weeks gathering their food on their knees.”



PETER HAMPTON, Arbroath.—There has been less than the usual amount of pleuro-pneumonia, but nearly all the cattle in the district have suffered from the foot-and-mouth disease, and in cows it has proved very injurious, the udders becoming completely diseased. These affections are due to contagion, which can be traced in almost every case. A great many cases of black quarter have occurred in young cattle. A few cases of splenic apoplexy and of red water. Horses have suffered not a little from affections of the digestive organs, arising from the quality of the food; and during the autumn, influenza, of a very debilitating character, affected nearly half the horses in the district.

**HADDINGTONSHIRE.**—ALEXANDER C. MUIR, Dunbar.—Pleuro-pneumonia has prevailed to a large extent, and about ninety per cent. of the cattle have suffered from the foot-and-mouth disease. They are attributed “to infection in markets and railway trucks.” A few cases of parturient fever and red water have also occurred. Among sheep, aphtha, foot-rot, and inflammation among lambing ewes have been the principal affections. Pigs have suffered from measles, and slightly from typhus.

“I do not wonder at pleuro-pneumonia being so common a disease, as I know, for a fact, that many animals go from this district every month to London and Edinburgh, some killed and some alive, suffering from this disease. Those that are far gone are sent to London; and I have known some so sent that must have been in a state of putrefaction on arrival, or soon after. The foot-and-mouth disease is never known here, except when new cattle are brought in. I have known men working among, and giving medicine to, cattle suffering from foot-and-mouth disease, suffer from sore mouths and hands, being the same disease to all appearance.”

P. WISHART, Haddington.—Pleuro-pneumonia in cattle has been very prevalent for some years back in East Lothian; during the year, both cattle and sheep have suffered very much from the foot-and-mouth disease. Cow-pox has been very prevalent. Horses suffered greatly from influenza and bronchitis, and affections of the digestive organs were very common.

**KINCARDINESHIRE.**—JAMES BIRD, Bervie.—Pleuro-pneumonia was very destructive on one farm during the summer months. The foot-and-mouth disease was very prevalent. They are due to infection. Quarter-ill carried off a great many stirks, and many valuable cows were lost by parturient fever. Red water is of frequent occurrence, except close upon the coast. During the spring, horses suffered greatly from colds and influenza. Affections of the digestive organs are common at all times.

“I have no means of knowing if the flesh of diseased animals is injurious. Every animal slaughtered, having the least appearance of disease, is consigned to the London or other markets.”

ANDREW RITCHIE, Laurencekirk.—Pleuro-pneumonia has been, and still is, very prevalent. The foot-and-mouth disease has also pre-



vailed extensively. "Pleuro-pneumonia I consider to be brought to this district by English or Irish cattle." Black quarter, parturient fever, and red water occurred to some extent; the first two being generally fatal. A great number of young pigs died from foot-and-mouth disease, caused by infection from cattle. Affections of the respiratory organs were of frequent occurrence among horses.

**LANARKSHIRE.**—**DAVID BROWNLIE**, Coatbridge.—A few cases of pleuro-pneumonia. The foot-and-mouth disease, of a mild form, has been very prevalent; very few animals escaping it, and is undoubtedly due to contagion. Parturient fever has been very prevalent and fatal. Some suffering from it I have known killed and sent to the butcher. Among horses, nothing particular to remark, except that affections of the digestive organs were very common.

**WILLIAM COCKBURN**, Glasgow.—Pleuro-pneumonia is not prevalent to any great extent at present. The foot-and-mouth disease has been very general in dairy stock and young cattle, "due chiefly to contagion." Quarter-ill is very rare. Parturient fever of occasional occurrence in cows in high condition. Cow-pox has occurred to a very small extent. Horses in general have been healthy. Acute indigestion is the most general complaint. Influenza, laryngitis, and strangles have prevailed to some extent, and an occasional case of glanders or farcy occurs.

**R. FINDLATER**, Ravenstruther.—Pleuro-pneumonia very severe, but confined to one district. The foot-and-mouth disease was very prevalent, and went through most of the shire. Black quarter was frequent. Parturient fever and red water much less so. Rot and inflammatory affections were the most prevalent diseases in sheep. Horses last spring suffered severely from influenza, but the deaths were few.

**JAMES M'CALL**, Glasgow.—Pleuro-pneumonia in cattle is on the increase. The foot-and-mouth disease exceedingly prevalent, due to contagion and bad ventilation. Of black quarter, splenic apoplexy, parturient fever, and red water there have been but few cases. Sheep have suffered most from liver disease. Among horses, affections of the respiratory organs have prevailed to a considerable extent of late. Affections of the digestive organs were not so numerous. Glanders and farcy have occurred to some extent, but were not so prevalent as last year.

Mr M'Call has known human beings suffer from disease communicated by diseased animals.

**PATRICK REID**, Easter Middleton, Gorebridge.—A few cases of pleuro-pneumonia; the foot-and-mouth disease was prevalent both in cattle and sheep, and was brought to the district by infected animals; had a few cases of glossanthrax among wintering cattle.

**LINLITHGOWSHIRE.**—**JOHN BORTHWICK**, Kirkliston.—A great many cases of pleuro-pneumonia in cattle; the foot-and-mouth disease was very prevalent; a great many cases of parturient fever occurred in cows; black quarter is almost unknown in the district.



Pigs suffered greatly from rheumatism. Amongst horses, affections of the respiratory organs were very prevalent, and affections of the digestive organs are always numerous.

**MID-LOTHIAN.**—**CORNELIUS CUNNINGHAM**, Slateford.—Pleuro-pneumonia, so far as I am aware, has not prevailed to any great extent; the foot-and-mouth disease was very common during a part of the past year, few dairies escaping it. Several cases of parturient fever in cows occurred. Disease prevailed to a far greater extent among horses in this district, during the past year, than for many years previous; affections of the respiratory organs were very numerous, influenza, terminating in typhoid pneumonia, being the most common disorder; affections of the digestive organs were very frequent and aggravated; skin affections were also common.

**J. HORSBURGH**, Dalkeith.—Pleuro-pneumonia has rather abated within the last twelve months, farmers are beginning to take better care to prevent it. Three-fourths of the stockowners attribute it to contagion, with whom I concur; while a few, who believe that there is no such infection, have had the disease in their stock since it was first imported, have it now, and are the means of propagating it through the country; all that are affected are now killed and sold for beef; we have here a slaughter-house for the special purpose. The foot-and-mouth disease has been prevalent almost everywhere for the last year; black quarter occurs occasionally in the hill districts, and sometimes red water; parturient fever in cows is common. Pigs always have the foot-and-mouth disease when it prevails among cattle. Affections of the respiratory and digestive organs are very common among horses.

“Pleuro-pneumonia has been in our country a considerable number of years. I saw among the first cases that were noticed, had heard of its progress westwards through Europe to England, then to Scotland, and formed the opinion I now hold, if proper means had been adopted, we should never have seen it, and until proper means are taken, we shall never get rid of it; but as long as our public authorities employ butchers as inspectors, allow all sorts of carrion to be brought into cities, punishing a guilty party but now and then, and allow diseased cattle to be sold at our fairs and markets, we shall continue to suffer from it. I am well aware that all the cattle that have disease and are killed, are sold for human food. I have not known one animal buried (as was usual after death) for at least fifteen years.”

**PERTSHIRE.**—**JOHN DOW**, Birnam, Dunkeld.—Two lots of cattle were affected by pleuro-pneumonia; in both instances it broke out in animals that were purchased in southern markets; foot-and-mouth disease was very common, and was brought by cattle exhibited at Battersea Show. Rot and braxy were the most prevalent diseases in sheep; the cases of louping-ill were far below the average number. Among horses, affections of the respiratory organs were very common, and prevailed extensively in a severe epidemic form in July and August; hardly a horse in the district escaped it.



**PETER GALLOWAY, Loan of Errol.**—Pleuro-pneumonia not very prevalent this season; the foot-and-mouth disease was very prevalent; they are due to infection and contagion. Among sheep, foot-rot was most prevalent. Horses suffered to a great extent from affections of the respiratory organs; affections of the digestive organs were also common.

**GEORGE MILLER, Auchtergaven, Bankfoot.**—Pleuro-pneumonia in cattle prevailed to a great extent, and has most commonly been traced to infection from Irish cattle bought in our markets; foot-and-mouth disease was very prevalent; a considerable number of cases of red water occurred. Foot-rot was the principal affection among sheep. Horses suffered to a great extent from affections of the digestive organs, and there were many cases of affections of the respiratory organs.

**RENFREWSHIRE.** — **ALEXANDER POTTER, Renfrew.** — Pleuro-pneumonia has prevailed to a large extent in the burgh town, but to a much less extent in country districts around. There were many cases of foot-and-mouth disease. Cases of splenic apoplexy were more frequent than formerly; parturient fever in cows is always very prevalent. Affections of the digestive organs were very common amongst horses.

**ALEXANDER ROBINSON, Greenock.**—Not many cases of pleuro-pneumonia. "I have scarcely ever had a case but I could trace its origin to contagion from animals brought into this district. The foot-and-mouth disease prevailed to a great extent among cattle, and there were more cases of parturient fever in cows than in any previous year. Among horses there was about the usual amount of affections of the digestive organs, less of affection of the respiratory organs, and a very few of glanders and farcy.

**ROXBURGHSHIRE.**—**GEORGE MATTHEWSON, Galashiels.**—Had a few isolated cases of pleuro-pneumonia among animals purchased at public markets; the foot-and-mouth disease has occurred to a very considerable extent. Both are attributed by farmers and stockowners in this district to the importation of diseased animals from Hallow and other large fairs, and the subsequent contact between diseased and healthy beasts.

The diseases that have principally prevailed among sheep are braxy, louping-ill, and sturdy. Colic has been the most prevalent malady affecting horses, and almost the only one leading to fatal results.

**WILLIAM ROBERTSON, Kelso.**—Rather below the average amount of pleuro-pneumonia in cattle. The foot-and-mouth disease has prevailed amongst cattle and sheep to a great extent; they are attributed to the introduction of animals suffering from these diseases. Black quarter has occurred to a smaller extent than formerly; there has been a very trifling amount of red water in cattle, and rather above the average number of cases of parturient fever in cows. In sheep the usual amount of sturdy occurred; parturient fever in ewes and gastro-enteritis in feeding sheep, and a peculiar affection of the



assimilatory system of lambs. Epizootic aphtha occurred in both pigs and sheep. Among horses there was rather below the average amount of affections of the respiratory organs, and an average of affections of the digestive organs; other affections, such as lymphangitis, erysipelas, diseases of joints, injuries, &c., have prevailed to somewhat above the usual extent.

"I have known several cases in the human subject bearing analogy to epizootic aphtha in cattle and sheep."

**STIRLING.**—**JOHN BRYCE**, Stirling.—A number of cases of pleuro-pneumonia, the foot-and-mouth disease, very general, attributed to contagion and infection. Parturient fever in house-fed cows of frequent occurrence; few cases of red water or black quarter; frequent cases of cow-pox. Among horses affections of the digestive organs were common, and affections of the respiratory organs of very frequent occurrence.

**WIGTONSHIRE.**—**JOHN DOIG**, Wigtown.—The stock of cattle on one farm were affected with pleuro-pneumonia. The foot-and-mouth disease was very prevalent last autumn; attributable to infection and contagion. There is always more or less of parturient fever and red water; black quarter was not so prevalent. Sheep principally suffered from rot, braxy, and sturdy. Affections of the respiratory organs were the most common maladies of horses.

#### IRELAND.

**ANTRIM.**—**JOHN M'DERMOTT**, Belfast.—Pleuro-pneumonia is becoming more prevalent, and is carrying off a great many animals. The foot-and-mouth disease is also becoming very prevalent; both are considered to arise from contagion. Red water has become prevalent, and a few cases of parturient fever occurred. In sheep, rot (from the liver fluke), scab, and ascites, and, by accounts I receive farther to the north, small-pox has been prevalent. In pigs, measles is the chief disease. Horses have suffered from affections of the respiratory organs, of an epizootic kind, to a very great extent. Stomach staggers, water farcy, weed, anasarca, in consequence of influenza, &c., have been of frequent occurrence.

Pleuro-pneumonia is on the increase, scarcely a week passes without it showing itself chiefly in small and poor dairies; also rot in sheep is becoming very prevalent, and scarcely a market day passes without a seizure of diseased mutton.

**ARMAGH.**—**JAMES MURPHY**, Armagh.—A very few cases of pleuro-pneumonia in cattle, almost unknown since 1857. Rot has been very prevalent in sheep during the winter. Influenza and affections of the digestive organs were very prevalent among horses, and a few cases of glanders occurred.

**DOWN.**—**J. B. DUNLOP**, Downpatrick.—A considerable number of cases of pleuro-pneumonia. Foot-and-mouth disease was very prevalent during the summer months and the beginning of winter. Very few cases of black quarter. A few cases of red water in some



localities with woody pastures. Parturient fever rather prevalent at the season. Among horses, affections of the digestive organs equal all the other diseases put together. Affections of the respiratory organs second in extent to them. Cases of weed occur in considerable numbers, and also a few cases of glanders and farcy.

**FERMANAGH.**—WM. WHITE, Enniskillen.—No pleuro-pneumonia in cattle. Foot-and-mouth disease to a considerable extent. Every year there is considerable loss from black quarter, and a few cases of splenic apoplexy in particular localities. Red water was very prevalent in the summer. Parturient fever not common. Liver disease has been frequent in sheep from the wet pasture. Among horses, affections of the digestive organs are numerous from want of skill and bad management, and affections of the respiratory organs are very general, owing to the damp locality. Glanders and farcy are rapidly decreasing.

**KILDARE.**—MICHAEL CLANCY, Brownston Lodge, Curragh.—Very few cases of pleuro-pneumonia in cattle. A good many cases of foot-and-mouth disease in cattle, and a few in sheep and pigs, and a few cases of parturient fever in cows. Rot prevailed among sheep to a great extent, and there were a few cases of red water. Among horses, distemper of a bad type was very prevalent; only a few cases of glanders or farcy occurred.

**LIMERICK.**—HUMPHREY KEYES, Limerick.—Pleuro-pneumonia in cattle is nearly all gone. The foot-and-mouth disease attacked nearly all the herds last summer, but is now completely isolated. They are solely attributable to interchanges with diseased herds spreading the disease by infection. Where there are no interchanges of stock, the cattle are comparatively healthy. Black quarter has swept away numbers of the young stock. Splenic apoplexy is of rare occurrence. Parturient fever is the scourge of the town dairies from injudicious management. Red water is very prevalent on some farms, causing much loss of condition, but is rarely fatal. Cases of glossanthrax occurred in October, but not to any great amount. The foot-rot, and the disease of the liver, "braxy," was very prevalent among sheep in some parts of the district. In pigs, splenic disease and inflammation of the small intestines, with choleraic symptoms, were very prevalent; the latter ran its course with great rapidity, and was generally fatal. Among horses, affections of the respiratory organs have been very prevalent, also skin diseases; but affections of the digestive organs were not so numerous. Glanders and farcy are very much on the increase in this district, owing to the bad management on the part of their owners.

"I have seen a whole family attacked with symptoms of poisoning, from which they did not recover for some weeks. It arose from eating the flesh of a diseased pig. They suffered from violent spasmodic pains in the bowels, which in two cases terminated in inflammation."

**MONAGHAN.**—JOHN HUGHES, Monaghan.—No pleuro-pneumonia, but an occasional case of foot-and-mouth disease. "There are no

causes to which these diseases are attributed when they do occur, save contagion." Black quarter is not seen so often as it used to be, red water occurs but rarely, and there is occasionally a case of parturient fever. Glossanthrax is frequently seen in a mild form among milk cattle. In sheep the scab has been troublesome in some parts of the district, and diarrhoea attacked the weakest animals of many flocks. In pigs the chief disease was typhus, called here "the disorder," which carried off great numbers, others have died with symptoms of vertigo. Among horses affections of the respiratory and digestive organs have been frequent; other affections, except inflammation of the lymphatics and rheumatism, have been rare. Glanders and farcy are on the decrease.

**ROSCOMMON.**—A. REILLY, Athlone.—Catarrhal affections among horses are of frequent occurrence, colic is the most frequent affection of the digestive organs, other diseases an average.

**WATERFORD.**—THOMAS RICHARDSON, Clonmel.—Several cases of pleuro-pneumonia in cattle, and a few of foot-and-mouth disease, one case of cow-pox. Cases of black quarter, splenic apoplexy, parturient fever, and red water occasionally occur. Sheep have died in great numbers in this district. Among horses, affections of the respiratory organs were very numerous, but not dangerous.

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*Losses amongst Sheep in Lincolnshire.* By JOHN GAMGEE,  
Principal of the New Veterinary College, Edinburgh.

SINCE my first general inquiries into the nature of prevailing diseases amongst animals in different parts of the United Kingdom, I have repeatedly been informed of the destruction amongst sheep by a disease of the lungs, occurring in Lincolnshire, especially during the spring months. From the 1st April this season, many flocks have been decimated, and my attention has been again drawn to the subject by Mr John George Dickinson, veterinary surgeon, Boston.

As usual, a great diversity of opinions has tended to perplex the farmer, and no systematic inquiry has been conducted. It has been said by some that the highly-manured turnips induced the disease, others looked upon the rank grass as its cause, and not a few have recognised that the flocks have been poisoned by the salves used for the treatment of scabby sheep.

The importance of the subject may be appreciated, when we learn that the losses amongst flocks have varied from 5 to 25 per cent.; that some flockmasters have lost a hundred sheep or more, and one veterinary surgeon has been dispensing drinks by the thousand, having four or five thousand sheep in his neighbourhood more or less affected.

It were well if farmers could be made to understand that no such frightful and general losses can occur without mismanagement; and it is much to be deplored that there is as yet no special machinery



whereby proper inquiries can be instituted, whenever whole districts are more or less impoverished by the operation of causes destructive to animal life.

At the root of the present evil is that easily prevented but widespread parasitic and contagious disease, "scab." We have a law relating to the prevention of contagious maladies, but it has not been enforced. We condemn a few scabby sheep coming from the Continent, and permit our markets to be infected by our own. One individual had recently 100 scabby sheep. The animals might have been cured in twenty-four hours and sold sound, but they were neglected, and week after week seven or eight were sold off in the public market in Boston. The results of such a system are such as might be anticipated. The malady spreads, and the farmers spend for the application of mercurial ointment. One dressing is often not effectual, and repetitions are common. Money, labour, and time are squandered, and not only fleeces destroyed, but the lives of sheep sacrificed.

I have rarely been more interested in the study of any disorder than in the one which the Lincolnshire flocks are suffering from at the present time. The immediate causes I find to admit of classification under three heads. *Firstly*, the mercury absorbed by the skin, especially when sheep are dressed more than once, tends to reduce the animal's powers, and to prevent the system effectually withstanding any morbid influence. In some instances it is the direct cause of death, and, as usual, about the ninth or tenth day after the application of the ointment. Attention has been drawn at various times by scientific men to the fact that ruminants, and especially sheep, are more readily poisoned by mercurial applications to the skin than any other of the domestic quadrupeds.

*Secondly*, the grease with which the mercury is incorporated in preparing the ointment tends to mat together the long fleeces of the Lincoln sheep. If the wool is opened out a few days after salving, it will be found knotted and plastered together so as to form an effectual and impervious covering, condensing the perspiration on the surface of the skin, and, indeed, soon arresting the action of the skin altogether. This cause operates most potently in inducing a poisoned condition of the blood, and is, in my opinion, the direct cause of the apnoea or suffocation, the pulmonary congestion and suffering, characteristic of the "supposed lung complaint in sheep."

Physiologists have long since shown that covering the skin with an impermeable coating is destructive to the life of an animal. Fourcalt, Magendie, and others have observed that if any quadruped has its skin covered with an impermeable varnish, or if the body is covered closely by a Mackintosh, leaving the head alone exposed, death soon occurs from suffocation. I have drawn attention in Scotland to the fatal results of covering lambs, especially when in a plethoric state, with the skin of the natural offspring of a ewe. Many more would die from this cause if the skins were kept longer on; but in any flock with a tendency to blood disease, the lambs die in a few hours, with



their lungs gorged and frothy mucus in the air-passages. These results are due to the accumulation in the blood of carbonic acid, ammonia, and organic products, which should be constantly thrown off by the skin. It is very important that I should notice the influence of the dry weather in producing the disorder. Had there been much rain, the fleeces would have opened up and been moist, whereas the dust and dirt have materially contributed to consolidate the matting which has so effectually checked the skin's exhalations.

*Thirdly*, my inquiries lead me to regard the transition from poor feeding to rich pastures as deleterious to sheep, especially when such a common cause of a plethora operates on a system poisoned by mercury, and by being covered with an almost impermeable coating due to the ointment.

Before referring to the symptoms, nature, and treatment of the disease, I may be expected to state on what grounds I have been led to refer the present mortality among sheep to the above-mentioned causes. All the flocks I have inquired into the history of have been saved. Those that have been dressed most frequently have suffered most severely. A considerable number of cases have presented the symptoms of mercurial poisoning, such as salivation and loosening of teeth. Several of the most intelligent farmers have distinctly traced the accidents to the "salving," and have noticed the escape of animals not dressed, or dressed only once, and the deaths of others that had been treated most severely and repeatedly with the sheep ointment. The losses have been greatest when four or five sheep alone have been smeared to the pound of the dressing. The fatality has ceased in about a fortnight or three weeks, but a number of animals have survived over that period with laboured breathing and other symptoms, indicating that their constitutions have suffered.

*Symptoms of the Disease.*—The reports I have generally received as to the appearance of the suffering animals have indicated that sheep in health have been suddenly seized with signs of suffocation, and have died in an hour or two. The animals pant, have a small frequent pulse, bloodshot eyes, and sometimes splutter frothy mucus from the nose immediately before they die.

I am satisfied, however, that the presumed absence of premonitory signs is rather due to the imperfect observation of shepherds than any other cause. I have inspected a flock, when several manifested languor, quick breathing, dilated nostrils, and capricious appetite, and yet the shepherds thought the sheep were all right. Some have noticed salivation and soreness of the mouth, indicated by the animals collecting their food with some difficulty. A few have witnessed occasional shaking and shivering. This is a very important symptom, as in all cases of suppressed action of the skin the temperature of the body is lowered.

There is no doubt that when the mercury has accumulated in the system, and the poisons which should have been thrown off by the skin have sufficiently modified the blood, severe symptoms occur so



as to destroy life in a very short time; but that is only the result of a destructive process which has been in operation ever since the application of the salve.

After death the blood in the heart and vessels is dark-coloured and fluid. The lungs are gorged with blood, and frothy mucus fills the trachea and bronchial tubes. The abdominal organs are healthy, and there are none of the signs of blood extravasations characteristic of anthrax or braxy.

*Nature of the malady.*—My readers will understand from what has been said, that, according to the circumstances under which animals are attacked, they die of congestion of the lungs or suffocation, and sometimes from pure mercurial poisoning. The fact that many deaths have occurred after repeated applications of mercurial ointment indicates that not a few sheep must have had their systems highly charged with mercury, and I expect that chemical analysis will demonstrate this. I shall not be astonished, however, if many of the carcasses show but a faint trace of mercury in them, owing partially to elimination, and chiefly to the prompt death from other impurities accumulating in the blood.

*Treatment.*—I hope that the light at present thrown on this malady will diminish the number of animals to be treated, but it is quite evident that the proper measures to adopt consist in effectually washing or clipping all sheep that have been salved, in keeping the animals quiet on bare pasture, or sheltering the sick ones in the farmyard. Blood-letting must be avoided, as it favours the absorption of the mercury, and weakens the vital resistance of the sheep. Tonics, oats, barley, common salt, &c., recommended by some, must be avoided. I do not approve of the animals being much disturbed by drenching, especially as all the sick ones, owing to the condition of their respiratory organs, may be choked by phlegm passing down the windpipe. I have suggested some experiments to Mr John G. Dickinson as to the management of the affected flocks, and I hope to report favourably on the results of a system of treatment based on a proper knowledge of the causes and nature of the disease.

The *prevention* of the disorder consists in preventing scab and other parasitic diseases, by enforcing the law relating to contagious affections amongst cattle, sheep, &c. Poisonous drugs should only be used by qualified professional men, and here we have a good illustration of the monstrous effects of quackery in the country. Preparations of arsenic, mercury, &c., so largely used by flockmasters, should not be sold as they are. Non-poisonous skin-dressings can and must be employed, and I hope all veterinary surgeons will turn their attention to the preparation of compounds destructive to parasites, but harmless to sheep and human beings. Whatever dressings are used should not be too stiff, and should be usually saponaceous. When flocks are scabby, veterinary surgeons should be employed to treat them, and see to their health, comfort, and safety, just as much as they have to do with regard to horses. They should not be called



when animals are gasping for breath and moribund. It is unfair to them, as they cannot perform miracles and purify poisoned blood in the way in which pure water may be made to displace impure from a pitcher. This is a stupid notion which professional men encourage when they bleed as a means of purifying the blood.

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*Supplementary Description of Component Structures, and further Observations on the Economy of, the Horse's Foot.* By Professor GAMGEE, Sen., New Veterinary College, Edinburgh.

WHEN I began to publish my notes on the structure and economy of the foot, I had already devoted, during many years, such means as opportunity had afforded to prepare for the work, by constantly applying myself to the subject in all its parts; my first anxiety being throughout to avoid committing error, and, above all, in trying to prevent the perpetuation of much that has long been prevalent, and which is as palpably wrong in theory as it is deplorably bad in practice. "*Before all other things, man is distinguished by his pursuit and investigation of truth.*"

In this paper, I shall try to show, as from an exterior aspect of the living horse, some structures, the economy of which I have sought to explain in detail in former communications in this *Review*.

From remembrance of the efforts of my own mind, at an early age, whilst trying to comprehend the character and movements of the foot of the horse, and from what more recent experience has taught, by reference to the works of the oldest writers on that animal to which I have had access, I have been led to return to the book of Nature as the essential means to dispel old errors, and to learn new truths.

When I contemplate how the first notions on the movements of the horse's foot interested me, and how truthful many of the impressions then made on my mind were, and when now I turn to the works of the authors referred to, I discover a marked analogy between views taken, and inferences drawn, by the youth and the sage. When seen without prejudice, facts look alike to the unlearned and the learned, the difference being, that the latter, having seen and learnt most, and from accumulation of knowledge had solved most.

It was from the above reflections that I determined to try and make myself understood on the character and functions of the component structures of the feet and limbs of horses, to a greater number of readers than I could hope to do by one means, that I am led now to show the subject in various aspects.

Before attempting the further descriptions which I purpose to submit, I must take on myself the responsibility of trying to dispel some errors of anatomical detail, which would, if allowed to stand unexposed, render all attempts to make the subject plain ineffectual. It is easier to establish new truths, where nothing has been said, than where error prevails; hence there is no choice, where the resolve



is made to work out the subject as far as possible in the way that I have begun the task.

In wrong descriptions of animal conformation, the effects which in length of time follow cannot be estimated; and these remarks apply especially to errors, at first small, which I shall more fully expatiate on hereafter.

The construction of an animal body, or any part of it, which the science of anatomy explains, requires the utmost care; inexact descriptions lead to false physiological deductions, and these again to erroneous pathological doctrines.

To show the necessity for going into this matter, I may make reference to some of the notions which stood in the way of any real progress to a knowledge of the functions of the foot, so as to provide for its requirements in health and when diseased, or how to shoe it under all or any circumstances; and where I have thought right to differ freely, I have in most cases seen my way clear to the exposition of facts, and believe that my deductions from them will, in due time, be endorsed by those physiologists and practical men whose opinions I value.

I opposed facts to fancies when I said that the foot does not widen when it bears on the ground, and that the sole in its normal state does not descend at same time, and when I asserted that the weight of the animal is not suspended by the laminæ, and when I say that these structures do not elongate under exertion to any extent hitherto understood. I have, moreover, shown that Nature has made provision throughout the structure of the foot to obviate its dilatation or widening, whilst it is called on to sustain the combined efforts of weight and action.

I have, moreover, stated my own views on the way the bearing is distributed from the coffin bone on to the sole, and have opposed the prevailing notions, which assume that the weight is imposed in a slanting direction, downward and backward, in which way it was said to fall in given proportions on to the splint, sessamoid, and navicular bones.

I have endeavoured to show that the functions of these structures is altogether of another kind from that which was attributed; and proved that the structure called the suspensory ligament, which was thought to be peculiar in texture and highly elastic in character, is totally devoid of the last property, as it is also of the function of supporting the sessamoid bones, from which supposed action its name was given; hence the name of the ligament is wrong, because it conveys wrong meaning and has actually misdirected inquiry, and the result is popular error regarding that powerful structure.

In a paper published in the *Review* for April, I expressed myself on the economy of the splint bones, showing that they act to great advantage, from their form and position, as buttresses for attachments, and then become powerful levers, their position being blended with that of other structures in raising up and flexing the foot.

If the position I have taken be wrong in any one part, the whole of my theory on the functions of the foot would be unreliable, because the observations have been made so that, in my belief, I have come to conclusions only after the chain of facts has become complete; therefore let it be shown that my views are wrong on the leading functions of one part, and the whole would prove faulty—the essential difference between prevalent views and my own relates to facts. The late William Percivall, in his interesting work on “Form and Action,” p. 67, says: —“The splint bones, pyramidal in shape, and adherent to the sides of the cannon, taper downwards into points, or rather terminate in small tubercular knobs, which have no resting-places, no articulation with any other bone beneath them; the consequence of which is, that the weight they receive in the support they give the body must have been directly transmitted to the cannon bone, had they not been cemented to its sides by a soft elastic substance, something of an intervening nature between cartilage and ligament, which admits of their yielding downwards, ‘descending’—as Professor Coleman’s expression used to be—‘every time pressure from above is imposed upon them.’ And as the superincumbent weight, in accordance with the laws of the centre of gravity, bears more upon the inner than upon the outer sides of the limbs, so the inner splint bone is furnished at the knee with an independent joint, *i.e.*, one of the bones of the knee-joint rests *exclusively* upon the head of the inner bone, which is not the case with the bone on the other side, that receiving but a part of the articulation of the bone of the knee above it.”

I submit, and no one will attempt to disprove the correctness, that there is no independent joint formed by the connection of the inner splint bone with that of the knee above it; nor does the trapezoid rest *exclusively* upon the head of the splint bone, but has a distinct articulation on to the head of the cannon; and, I may further add, that the articulations of the same bone of the knee with the largest of that order at three points, when taken with the true action of the joint, shows that it bears on to and against the large bone of the knee, the os magnum; this it does in the same way as the os calcis articulates with and bears forward against the astragalus and the pisiform as attached and acting with the unciform or hook-like bone of the knee.

I had not intended to enter more into detail on the structure of the knee and hock-joints at present, than I had already done when speaking of the way the functions of these and the distal part of the feet are blended; and, in taking this course, I am led to do so more for the sake of dispelling much interfering hypothesis than for any special importance I attach to the economy of the part noticed above, when I find a false description of structure followed by wrong interpretation of function, and undue attention is paid to the connection of two bones which call for no more notice than that of the other structures contiguously situated.

(To be continued.)



# EDINBURGH VETERINARY REVIEW

AND

## *Annals of Comparative Pathology.*

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### BILL FOR THE PREVENTION OF CONTAGIOUS DISEASES AMONGST ANIMALS.

As a social science question the prevention of cattle disease must be regarded as of primary importance. No country so much as our own needs cheap animal food. Human beings are congregated together here in masses of unprecedented magnitude. There is keen competition in every profession and trade, and people can attend little to matters affecting their welfare, but which are not directly connected with their pursuits in science or art. It is needless crying out concerning the sale of unwholesome meat, as the housewife can only protect her family by trusting to a respectable tradesman. If her means are scanty and the family large, she goes where she is tempted by quantity rather than quality, and is served with the flesh of cows that have died of pleuro-pneumonia, epizootic apthæ, milk fever, or other frightful diseases, and for which, perhaps, various drugs in large doses have been prescribed by the cow-leech or the veterinary surgeon. However revolting the practice, there is no doubt that in no part of the world have the dealings of diseased-meat butchers been so extensive as in the United Kingdom, especially since 1842.

It must have struck any one who has paid attention to the occasional outcries as to the traffic in diseased meat and milk, that there has been no one in this country to interfere for the public good. Fortunately, last year the Medical Department of the Privy Council Office took up the question, and owing to the ever-increasing mortality of stock, legislation has been determined on. We have little doubt, therefore, that some wholesome law will be framed now to check the sale of unwholesome animal food, and we are happy to see that the Bill at present before the House, and which will be read a second time on the 2nd of June, provides for the appointment of an Inspector-General of Live Stock to report to the Privy Council "as to any contagious or infectious disease which may prevail among

cattle, sheep, pigs, or other animals, within the said United Kingdom, together with the best means of prevention and cure thereof, and also whether any such disease has been imported with cattle, sheep, and pigs, or otherwise from foreign countries, with the particulars thereof, and generally on any matter of importance connected therewith, which reports shall be annually laid before Parliament."

It is a well-known fact that everybody's duty is nobody's duty, and the public interest never suffers so much as when important concerns are left in the hands of irresponsible people. To frame an Act and not to devise the means to enforce that Act, would, in our opinion, be no legislation at all; and we think Mr Holland has judged very wisely in aiming at the collection of facts which, in the course of time, must prove of incalculable value to the farming community in indicating how to preserve the health of the herds and flocks, without which the fertile lands of this country cannot provide aliment for the million. There can be no doubt that the most certain means to check the trade in diseased meat and milk is to prevent disease. This is Mr Holland's desire, and it is this feeling that has lead to the framing of the subjoined Bill.

The following is a copy of the Bill introduced a few days since by Mr Holland to extend the provisions and continue the term of the 12th Vic. cap. 107, and of 17th Vic. cap. 62, to prevent the spreading of contagious or infectious disorders among sheep, cattle, and other animals. After reciting the objects of the Acts named, the Bill proceeds:—

"Be it therefore enacted—

"1. It shall be lawful for the Lords and others of Her Majesty's Privy Council to appoint from time to time an inspector-general of meat, cattle, pigs, sheep, and other animals, who shall be removable at pleasure, and who shall have power, within all parts of Great Britain and Ireland, at all times to inspect any oxen, bulls, cows, heifers, calves, pigs, sheep, and other animals landed from any ship or vessel in any port, or being in any fair, market, highway, or other public place; and such inspector shall have all the same powers which the clerk or inspector of any fair or market, or any constable or policeman, have or has under the said first recited Act or this Act; and such inspector-general shall report annually to the Lords of Her Majesty's Privy Council any matter which may come to his knowledge, and in his judgment is necessary to be reported, as to any contagious or infectious disease which may prevail among cattle, sheep, pigs, or other animals within the said United Kingdom, together with the best means of prevention and cure therefor, and also whether any such disease has been imported with cattle, sheep, and pigs, or otherwise, from foreign countries, with the particulars thereof, and generally on any matter of importance connected therewith, which reports shall be annually laid before Parliament.



“2. Such inspector-general shall be subject to such orders and regulations, and the performance of such duties, from time to time, as the Lords and others of Her Majesty’s Privy Council, or any two or more of them, from time to time, may make and assign, and shall be paid, out of such money as may be provided by Parliament for the purpose, such salary and allowances for travelling and other expenses as may from time to time be fixed by the Commissioners of Her Majesty’s Treasury.

“3. Any person wilfully interrupting or preventing such inspector-general in the execution of his duty shall, for every offence, forfeit and pay any sum not exceeding twenty pounds, to be recovered in like manner as directed by the said first-mentioned Act, with respect to penalties thereby imposed.

“4. If any person shall bring, or cause to be brought or driven into any market, fair, or public place, or along any highway, any ox, bull, cow, or calf, or any oxen, bulls, cows, calves, or sheep, knowing them or any of them to be infected with or labouring under any contagious or infectious disorder whatsoever, then and in such case it shall be lawful for any clerk, inspector, or other officer of such fair or market, or for any constable or policeman, or other person authorised by the mayor or any justice of the peace having jurisdiction in the place, to seize the same, and report such seizure to the mayor or any justice of the peace; and it shall be lawful for such mayor or justice either to restore, or cause the same to be destroyed or otherwise disposed of, in such manner as he shall deem proper; and the person offending shall, on conviction, forfeit and pay any sum not exceeding twenty pounds.

“5. It shall be lawful for any inspector, constable, or policeman, or other person authorised as aforesaid, having cause to suspect that any meat unfit for human food and intended for sale is within or upon any house, slaughter-house, building, or premises attached or belonging thereto, to enter and search the same; and the possession of any such meat unfit for human food and intended for sale shall be deemed an exposure and offering of such meat for sale within the meaning of the third section of the said first-mentioned Act.

“6. The said Act of the twelfth year of Her Majesty (extended by the said Act of the seventeenth year of Her Majesty) shall be read and construed as if this Act was incorporated therein, and all the provisions of the said first-mentioned Act was incorporated therein, and all the provisions of the said first-mentioned Act with respect to penalties and forfeitures thereby imposed, and the recovery and application thereof, shall be applicable accordingly.

“7. The said two Acts in the last section mentioned and this Act shall continue and be in force until the first day of August, one thousand eight hundred and seventy, and until the end of the then next session of Parliament.”

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## INTERNATIONAL CONGRESS OF VETERINARY SURGEONS AT HAMBURGH.

LETTERS have been flowing in from all parts, approving of our proposal to hold an International Congress of Veterinary Surgeons at

Hamburgh in July. It is quite evident that the profession throughout the Continent is alive to the importance of such a Congress, and there is but one serious drawback to the undertaking. Not a few of the Colleges, including the three of France, have their holidays at a late period of the year. They work on through July to the middle of August, and are engaged during these two months with preliminary and other examinations. Notwithstanding this heavy drawback, we anticipate a good muster of the learned men of our calling from many parts of Europe. We learn that it is the intention of several British veterinarians to attend the Congress. We hope the President of the Royal College of Veterinary Surgeons may honour it; and we have only one word of advice for all intending visitors, viz., that they should communicate with us, so as not to be disappointed as to lodgings, and we shall do our best to secure for them suitable accommodation. Hamburgh is to be thronged, and it is not desirable to leave all arrangements to the last. We deem it necessary to reproduce here the prospectus issued by us in the month of April:—

It is a fact well worthy of notice, that with progress in the commercial relations established between different countries, with greater facilities for the transit and sale of stock so as to meet the demands of Western Europe, there has been, during the last twenty years, an increased prevalence of contagious disorders.

The want of accurate statistics relating to the losses sustained by plagues communicated from country to country, in the lines of communication established by trade, is severely felt. It is owing to this want that no measures have been suggested to, or, at all events, adopted by the several Governments of Europe, for their individual and mutual benefit; and that Europe is now suffering, to a very considerable extent, from the system by which one people attempts to save itself from loss, by disposing of diseased and infected stock to another.

It is with a view to give an impetus to the rearing of stock—it is as a means of direct encouragement to agricultural enterprise, that it is proposed to hold an International Congress of the Professors of Veterinary Science at Hamburgh, and of members of the Veterinary Profession generally, during the period that agriculturists are invited to derive all the advantages of an International Agricultural Exhibition.

It is hoped that the representatives from different parts of Europe will meet together with an earnest desire to demonstrate the impor-



tance of Veterinary Science, and with a view to suggest an uniform system throughout Europe for the prevention of plagues, that are a source, at all times, of pecuniary loss, and not unfrequently of disease to man.

In order to fulfil these objects, it is proposed that the representatives from different countries should communicate in the form of Essays as much information as possible on the following points:—

*Firstly*, On the extent to which contagious diseases prevail in their respective countries.

*Secondly*, On the imports and exports of live stock, and on the direction in which the plagues chiefly spread in each country.

*Thirdly*, On the means recognised by the author of the essay as most effectual to prevent the diseases.

Original papers on any Veterinary Subjects may be read during the International Congress.

It is, moreover, proposed that, with the aid of the information thus obtained, a statement of facts should be prepared, and resolutions drawn up, to be submitted to the different Governments of Europe, with a view to the institution of an uniform system for the protection of stock from plagues, which owe their origin, as a rule, to the climates and soils of the East.

It will then remain for the People or the Governments of different countries to adopt or reject the propositions of those best qualified to advise on the important social questions to be discussed at the International Congress. If the advice be acted on, the object of the Congress will be achieved; and if not, there can be no doubt that an interchange of opinion and a collection of facts cannot fail to interest as well as benefit the Veterinary Profession in all parts of Europe.

All Gentlemen who intend to take part in the International Congress, are desired to communicate with Professor JOHN GAMGEE, Principal of the New Veterinary College, Edinburgh.

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## ROYAL COLLEGE OF VETERINARY SURGEONS.

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### QUARTERLY MEETING OF COUNCIL.

AT a meeting of the Council held this 22nd day of April, 1863:—  
*Present*:—The President, Messrs Braby, Ernes, Field, Goodwin, Harpley, Jex, Moon, Wilkinson, and Secretary,—the President in the chair:—

The Annual Report of the Council, as prepared by the Report Committee, was read and adopted.

The minutes of the preceding meeting were read and confirmed.

The balance-sheet of the receipts and expenditure, as audited, was laid on table.

The adoption of the report was moved by Mr Field, seconded by Mr Goodwin, and carried.

The thanks of the Council were awarded to the Committee.

A new book was ordered for the entry of the rules, orders, and bye-laws of the College.

The Council gave instructions for bye-law No. 27 to be duly signed and sealed, in accordance with the provisions of the Charter.

By order of the Council,

W. H. COATES, *Secretary*.

At the several meetings of the Court of Examiners of the Royal College of Veterinary Surgeons, which have just been held, the following gentlemen passed their examinations, and were admitted as members of the body corporate :—

*April 27.*

Mr John M'Cutcheon, Dulwich, Surrey.

Mr John Alex. M'Kenna, Belfast.

Mr Thomas H. Ford, Biggleswade, Beds.

Mr Henry Lawrence, jun., Stewards Romford, Essex.

Mr John Freeman, Hull.

Mr George Emerton, Great Herwood, Bucks.

Mr Henry Peele, Durham.

Mr Louis V. Plageman, 'St Kitts, West Indies.

Mr Owen Thomas, Llandilo, Caermarthen.

*April 28.*

Mr George T. Cross, King's Lynn, Norfolk.

Mr James Buckeridge, Hungerford, Berks.

Mr George Fordham, East Peckham, Kent.

Mr Samuel James Rayment, London.

Mr Thomas D. Hulme, Congleton, Cheshire.

Mr Wm. Rhys Watkins, Brecon, South Wales.

Mr Wm. Jennings, Fritwell, Bicester, Oxon.

Mr William T. Moore, Gateshead, Durham.

Mr George H. Plumbly, Southrepps, Norfolk.

Mr Harry D. Pritchard, Wolverhampton.

Mr John W. Hedley, Richmond, Yorkshire.

Mr John Dobson, Holbeach.

*April 29.*

Mr Alfred W. K. Fordham, Royston, Herts.

Mr Joseph N. Allison, Bedlington, Northumberland.



Mr Edward Here, Scilly Isles, Cornwall.  
Mr George S. Whitemore, Langport, Somerset.  
Mr Eusebius G. Crowhurst, Warbleton Hurst Green, Sussex.  
Mr Albert E. Barrister, Peasmarsh, Sussex.  
Mr Frederick W. Barling, Newnham, Gloucester.  
Mr Samuel L. Buckley, Oldham, Lancashire.  
Mr Thomas H. Ward, Thaxted, Essex.  
Mr Charles W. Elam, Huddersfield.  
Mr Thomas Walley, Market Drayton, Shropshire.

*April 30.*

Mr Thomas W. Butler, Newbury, Berks.  
Mr Walter P. Fooks, Dartford, Kent.  
Mr Joseph Attwood, Willenhall, Staffordshire.  
Mr John D. Overed, Blofield, Norfolk.  
Mr Alfred Bland, Boston, Lincolnshire.  
Mr John G. Furnivall, Bayswater, London.  
Mr William J. Pickford, Kingsbridge, Devon.  
Mr Charles J. Pyatt, Nottingham.  
Mr William J. Easton, Woodford, Essex.

*May 1.*

Mr William J. Anderton, Shipton-in-Craven, Yorkshire.  
Mr Herbert Springett, London.  
Mr Thomas A. Byron, Bradford, Yorkshire.  
Mr Robert T. Hardy, Grantham, Lincolnshire.  
Mr Samuel W. Vines, London.  
Mr Henry Edwards, St Albans, Herts.  
Mr Jacob Howe, Keswick, Cumberland.  
Mr Harry East, London.  
Mr Henry Ching, Clapham, Surrey.  
Mr Edward Ewing, Clapham Park, Surrey.  
Mr James Moore, jun., London.  
Mr Job Wheeler, Shurrock Grays, Essex.  
Mr Jacob Dawson, Kettering, Northamptonshire.  
Mr Augustus M. Loades, Gateshead, Durham.

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ANNUAL MEETING OF THE ROYAL COLLEGE OF VETERINARY  
SURGEONS.

The Annual Meeting of this body was held on Monday, the 4th of May, at the College, Red Lion Square—the President, J. B. SIMONDS, Esq., in the chair.

The Secretary, Mr COATES, read the advertisement convening the meeting, and the minutes of the previous meeting were duly confirmed.

The following Report of the Council was then read:—

## REPORT OF THE COUNCIL OF THE ROYAL COLLEGE OF VETERINARY SURGEONS FOR THE YEAR 1862-3.

The official events of the last year have not been either very numerous, or of great magnitude, yet they will be found to be interesting to the Members of the Royal College of Veterinary Surgeons, and tend to show that the Council has not been unmindful of the well-being of the veterinary medical profession, nor lax in its endeavours to utilise the opportunities which have seemed favourable for promoting the material interests and advancing the social position of the body corporate. And although the solicitude which the Council has felt, and the exertions which it has made, have not been attended with complete success, it is, nevertheless, not without hope of hereafter obtaining more favourable results, by a judicious perseverance in the course which the necessities, and, perhaps, it may be urged, the rights of the profession so clearly point out.

In the early part of the year steps were commenced for readjusting the *modus operandi*, by which the section of the Board of Examiners for Scotland had hitherto exercised its functions; and the Council is sanguine that the alterations which have been made will prove satisfactory, inasmuch as it has been able to make concessions without either abridging its power or sacrificing any fundamental principle.

At the first meeting of the year the Council proceeded to the election of its office-bearers, when Professor J. B. Simonds was elected President, and Professors Dick and J. Gamgee, with Messrs M. J. Harpley, W. Goodwin, J. S. Gamgee, and T. R. Gowing, Vice-Presidents. Mr W. H. Coates was also elected Secretary and Registrar.

The most important event of the year is the attempt which was made to obtain from Parliament an immunity in favour of the Members of the Royal College of Veterinary Surgeons respecting service as jurors. The time which the Council had at its disposal was very limited, nevertheless a petition to the House of Lords was carefully prepared, embodying a clause praying for such an exemption to be added to a bill then before Parliament. It was presented to the House by Lord Portman, and supported by many of the Lords. The bill, thus amended, was passed and sent down to the Commons, where, on a division, the votes for and against retaining the clause were equal. It is to be regretted that the casting vote of the Speaker was, however, adverse, and the clause was consequently struck out of the bill.

This disappointment has not destroyed the Council's assurance in the justice of the cause, but will, on the contrary, lead to renewed exertions and more matured organisation on a future occasion.

During the *interregnum* which took place between the retirement of the late secretary and the appointment of his successor, the arduous duties of the office were voluntarily performed by Mr Braby, the treasurer; and the Council, thinking it would only be carrying out the



wishes of the body corporate by offering a material acknowledgment of its obligations to that gentleman, presented him with a testimonial consisting of a silver tea-service.

The Council, ever anxious to give prominence to the Royal College of Veterinary Surgeons as one of the institutions of the country, have deemed it advisable that the publishers of various directories should be supplied with correct lists of the members of the college.

A new and revised edition of the Register has been published, to which is added a county and also an army list. These additions will doubtless meet with the approbation of all who are interested in, or affected by them.

During the year a Committee of Inquiry has, with much difficulty, been able to prepare a statistical report, by which it will be seen that a vast amount of practice is still in the hands of unqualified practitioners, leaving the graduates of the Royal College of Veterinary Surgeons in a great minority.

The statistical returns up to the present time show that the number of members of the Royal College in practice in the United Kingdom is only 1018; while the number of those who assume the title of veterinary surgeon is 1244, and those practising as farriers, 1189.

The following is the return furnished by the committee:—

	Members of the R.C.V.S.	Assuming the Name of Vet. Surgeon.	Farriers, &c.		Members of the R.C.V.S.	Assuming the name of Vet. Surgeon.	Farriers, &c.
Bedfordshire .....	4	13	7	Norfolk .....	38	45	41
Berkshire.....	14	21	19	Northamptonshire..	8	12	24
Buckinghamshire...	11	13	17	Northumberland...	16	—	—
Cambridgeshire ...	10	12	32	Nottinghamshire...	22	12	26
Cheshire .....	16	12	6	Oxfordshire .....	6	5	4
Cornwall .....	4	21	11	Rutlandshire .....	2	—	—
Cumberland.....	9	7	10	Shropshire .....	16	27	69
Derbyshire .....	19	35	29	Somersetshire .....	26	31	50
Devonshire .....	23	33	35	Staffordshire .....	24	11	31
Dorsetshire .....	5	25	14	Suffolk .....	24	60	44
Durham .....	14	16	15	Surrey .....	25	13	16
Essex .....	22	54	13	Sussex .....	17	51	11
Gloucestershire ...	13	30	43	Warwickshire .....	27	23	32
Hampshire .....	15	16	12	Westmoreland.....	1	—	—
Herefordshire .....	6	10	36	Wiltshire .....	12	18	21
Hertfordshire .....	14	20	14	Worcestershire ...	11	11	32
Huntingdonshire...	8	16	9	Yorkshire.....	70	104	141
Kent.....	23	36	28				
Lancashire .....	62	101	29	WALES.....	10	7	16
Leicestershire .....	22	24	29	IRELAND .....	36	18	11
Lincolnshire.....	41	74	101	SCOTLAND.....	164	84	57
Middlesex .....	103	112	52				
Monmouthshire ...	5	11	2	Totals.....	1018	244	1189

The number—1244—who unscrupulously assume the title which the possession alone of the diploma ought to confer, by calling themselves “Veterinary Surgeons,” affords a striking corroboration of the well-founded and long-entertained assurance that the profession requires some legislative support.

The Council, therefore, suggests the propriety of each member of the College giving practical effect to the working out of this *desideratum* by inviting the co-operation of his representative in Parliament.

A Committee has been appointed for the purpose of preparing a Petition to Parliament, with a view to obtain an Act for the better protection of the Members of the Body Corporate, and also for obtaining for them the immunities and exemptions to which they deem themselves justly entitled.

Scientific works have been presented by Professors Brande, Taylor, and Simonds to the Library, and also Reports from the Veterinary Institution of Saxony.

The following address of congratulation to the Queen, on the marriage of His Royal Highness the Prince of Wales, has been transmitted to the Right Honourable Sir George Grey, the Secretary of State for the Home Department:—

“TO THE QUEEN’S MOST EXCELLENT MAJESTY.

“May it please your Majesty,

“We, the President, Vice-Presidents, and Council of the Royal College of Veterinary Surgeons, desire humbly to approach your Majesty, to express our heartfelt congratulations on the Marriage of His Royal Highness the Prince of Wales with Her Royal Highness the Princess Alexandra of Denmark.

“We earnestly pray that this auspicious event may conduce to the personal and domestic happiness of your Majesty, and that, under the all-powerful influence of your Majesty’s example, it may also ensure the fulfilment of the sanguine and well-founded hopes of a loving and devoted people.

“Given under our common seal, this 10th day of April, 1863.

(Signed) “JAS. B. SIMONDS, *President.*”

The following reply to the address of congratulation has been received:—

“WHITEHALL, 23rd April 1863.

“SIR,—I have had the honour to lay before the Queen the loyal and dutiful Address of the Royal College of Veterinary Surgeons on the occasion of the Marriage of his Royal Highness the Prince of Wales; and I have to inform you that Her Majesty was pleased to receive the Address very graciously.

“I am, Sir, your obedient Servant,

G. GREY.”

“The Secretary to the  
“Royal College of Veterinary Surgeons.”





number of members was small; for he saw, by the advertisement on the cover of the *Veterinarian*, that they were applying for situations as assistants. It appeared from the report, that the country was badly provided with veterinary surgeons. In some counties there were only four, and in others six. The number of duly qualified veterinary surgeons was, no doubt, correctly given; but it was not likely that they had a complete return of those who falsely assumed that title, and who, he had no doubt, were double the number stated in the report. The question arose as to how this evil was to be remedied, for unless some means was found to check it and to protect the members, the veterinary profession must ultimately come to a standstill. It had been stated that they ought, by education, to show the superiority of the members, and thus drive the quacks out of the field; but, in order to do that, the students must be assured of finding the means of existence. If they could not find any other protection, they ought at least to ask from the legislature that those who had not passed the College should not assume the name of veterinary surgeons. But he thought that something more than that might be done. It was much to be regretted that, in a country where the domestic animals were so numerous and valuable, and so much improved, such a state of things should exist. It was incumbent upon the members of the body to interest themselves in the matter, so that they might obtain some legislative enactment that would place the profession in a better position.

Mr ROBINSON thought the proper remedy would be found in multiplying the members of the profession; so long as they were in the minority in point of numbers, they must expect to find persons assuming the name of veterinary surgeons who were not members of the College. Supposing an Act of Parliament passed for the purpose of putting down unqualified persons, who had they to supply their places? They ought not to complain of farriers pursuing their occupation, but set to work to send a better class of men into the country.

Professor GAMGEE said, that many years ago he contradicted the statement that the profession was overstocked; and showed by statistics instead of there being, as in some countries, one veterinary surgeon to 35 square miles of surface, there was in England only one to 250 square miles, notwithstanding the larger proportion and value of stock in relation to area. The want had evidently been felt, and accordingly it would be noticed that the College had had annually more students to educate and more members to qualify, so that, to a certain extent, a remedy was gradually being created. There was one remark he wished to make upon the distribution of veterinary surgeons over the country. It was a fact, too painfully known to many of the members, that within the last fifteen years contagious epizootics had raged throughout the United Kingdom, with which the veterinary surgeon could not cope by ordinary remedial measures. Instead of the veterinary surgeon working hand in hand with the



farmer to increase the meat supplies in the kingdom, and to enhance the value and position of the stock, the diseased meat butcher was called in; and when the veterinary surgeon should be employed to stop disease, animal after animal was sent into the market, so that it was found that not less than one-fifth of the total amount of live stock consumed in the country was diseased. It had been his duty to draw attention to the matter in other places, and he was happy to say that the feeling was strengthened, that with the prevalence of contagious diseases it was impossible to have an increase in the amount of stock throughout the kingdom. They ought all to act as one man for the prevention of these epizootics. Twenty-five years ago, when they were unknown, every one was speaking of the practical value of veterinary surgeons. Mr Youatt had been working very hard to get a professor of cattle pathology appointed to the College, and had succeeded, but unfortunately the epizootics had, to a great extent, neutralised the advantages of educating veterinary surgeons, and there was no doubt that killing disease out of a farm had become far too much the practice, instead of curing the disease; so much so that veterinary surgeons often felt themselves bound, on going into a farm, to say, "You had better slaughter that animal; I can do nothing for you." He thought that something should be done to put a stop to the constant influx of these plagues that were invariably passing from east to west, but never originating spontaneously in this country. There were many places where animals were dying at the rate of from 30 to 60 per cent. per annum, and the veterinary surgeon was never called in. In some places where he went to examine the stock, he found individuals administering tincture of aconite, and quacks or dairymen dosing animals with poisonous drugs. The farmers would not pay the veterinary surgeon's bill, but would take the ready cash of the butcher.

The PRESIDENT said it was not a part of the profession to interfere with the importation of animals from abroad.

Professor GAMGEE thought it was the duty of the profession to put a stop to the traffic in diseased animals. Some persons thought the more disease there existed, the better off the members of the profession would be; he totally denied that statement. The interests of the veterinary surgeon were identical with the interests of the public. He was afraid that Parliamentary restrictions could not be easily obtained; but their duty was to produce more veterinary surgeons, and to impress upon them all the importance of urging all over the country the prevention of disease.

Professor BROWN said that the insufficiency of veterinary surgeons in the country constantly came under his notice. It had occurred to him whether a Committee of the Council might not be appointed to direct the placing of the members whom they passed. He knew many districts still remaining perfectly unoccupied. In Gloucestershire there was an excellent opportunity for a young man just starting into practice, who would be received in the most friendly spirit.



Mr ERNES said that the existence of so many unqualified practitioners was very disheartening to the legitimate veterinary surgeon. It often happened that when businesses were advertised in the country, and the returns came to be examined, extending, perhaps, over a large tract of country, they did not amount to more than L.200 or L.300 a-year; and it was not likely that they could get men who would devote themselves to veterinary studies, and give the necessary time for obtaining a diploma, with such a prospect before them. The profession ought not to have to contend against unqualified persons, and, if it were properly protected, there would be at once an influx into the profession of men of better education.

Mr GOODWIN said, that although he was not in practice, he still took, as he always should do, a great interest in everything that belonged to the profession. He recently read in the newspaper a leading article, consisting chiefly of quotations from statements by Professor Gamgee, in which reference was made to the mortality of animals from splenic apoplexy, and it was stated that, so virulent was the disease, that even a few drops in a bowl of water would cause certain death. He had been asked by several persons what was splenic apoplexy, and he confessed that he was unable to answer the question. It had been stated that it was the same as the German 'miltzbrandt'—he (Mr Goodwin) had always understood that that was a perfectly distinct disease. A good deal had been lately said, also, about 'ovine small-pox.' Having recently read an excellent French veterinary work on the subject, he found that the malady had been well known in France for more than 200 years, and that, although the symptoms somewhat resemble small-pox, the two diseases were essentially different—it being stated that small-pox could not be produced from the virus taken from the affected animals. He recently read a paper communicated to the Royal Society in 1804, by Sir Joseph Banks, who stated what might be expected some day or other, if we did not prevent the importation of diseased animals into the country; and he also stated that the two disorders to which he had referred ought not be confounded. He did not comprehend how English veterinary professors, after all the information previously given upon the subject, should take upon themselves to throw it aside, and call the disease that had recently appeared small-pox.

The PRESIDENT said that was not the proper time or place to discuss a scientific question. They believed that the name given to the disease was warranted by the progress of the affection, and by the symptoms that were developed; and, if the occasion were a fitting one, they would no doubt be able to convince Mr Goodwin that the name was not inappropriate, as he supposed.

Professor SPOONER thought that the report should contain some further information on the subject of the *modus operandi* by which the section of the Boards of Examiners for Scotland had hitherto exercised its functions. They were not enlightened as to what the



alterations were, and, as the subject was of great importance, every information respecting it should be afforded. Reference was made in the report to the attempt to obtain from Parliament certain immunities in favour of members of the College, and it was stated that when the subject was brought before Parliament, the casting vote of the Speaker was against them. It ought to be understood that that was a mere matter of form, and the Speaker was personally in favour of the clause against which, in his official capacity, he thought it expedient to vote.

The PRESIDENT said that the members were aware of the state of things that had existed, for some time past, in reference to Scotland. Parties very strong in power had done all they could to oppose the onward progress of the profession, inasmuch as they had adopted means for bringing into the profession persons who were not members of the body corporate. Various suggestions had been made from time to time, with the view of remedying that state of things, and for the last few years there had been a great disposition on the part of those in authority rather to work with the Council than against it. At the same time, they were not, perhaps, free to take exactly the course which they desired; and the Council, believing that conciliatory measures were to be preferred to coercive, had thought it right to make some alteration in one of their bye-laws, to facilitate the examination of the members of the Scotch schools by a board of the corporate body. The alterations were apparently not very considerable, but were found to have a beneficial effect. One alteration was to change the period of notice from 14 days to 7, and the fees had to some extent been diminished. It was not to be denied that there was a great disposition on the part of gentlemen in the north to object to what they call London centralization. A secretary had accordingly been appointed to act for the body corporate in the examinations for Scotland, and facilities had been given him for transacting the business which would come before the Scotch Board. That had had a beneficial effect; the result was that a larger number of pupils had entered from the Scotch schools this year than had entered on previous occasions. Several speakers had referred to the necessity of increasing the supply of veterinary surgeons, and giving them facilities for obtaining support as practitioners. He was happy to say that no fewer than 90 members had been admitted to the College this year, being one-tenth part of the entire number. Their admission will, of course, have an important bearing upon the finances of the College, the fees from the persons examined, about 100 in number, producing an income of upwards of L.700.

The motion for the adoption of the report was unanimously agreed to.

The PRESIDENT stated that the members of Council who retired by rotation were—Messrs E. Braby, T. Jex, F. R. Silvester, C. Dickens, W. Barrow, and B. Cartledge. These gentlemen were eligible for election, and offered themselves accordingly, but it was open to



any gentleman to propose any other candidate. At the same time, he thought that unless, for very good reasons, it would be well for the members not to cast off their old friends, the introduction of "new blood" not having generally proved very beneficial.

The following candidates were then proposed for election:—Prof. John Gamgee, by Mr Wilkinson; B. Cartledge, by Mr Robinson; C. Secker, by Mr Lawson; C. Dickens, by Mr Pritchard; T. Jex, by Mr Burley; F. R. Silvester, by Professor Spooner; M. J. Harpley, by Mr Braby; J. C. Broad, by Mr Batt; H. F. Batt by Mr Woodger; E. Stanley, by Mr Dickens; E. Braby, by Mr Ernes; W. Barrow, by Professor Spooner.

Mr Wilson and Mr Moore were appointed scrutineers.

The scrutineers stated the result to be as follows:—

Mr B. Cartledge,	38	J. C. Broad,	20
Mr Silvester,	34	C. Dickens,	18
Mr Braby,	32	M. J. Harpley,	13
Mr Jex,	27	W. Barrow,	10
Prof. Gamgee,	27	H. F. Batt,	8
C. Secker,	26	Ed. Stanley,	4

The PRESIDENT declared the following gentlemen elected, Messrs Cartledge, Silvester, Braby, Jex, Gamgee, and Secker.

Mr ERNES moved a vote of thanks to the President, who, he said, had had a very onerous year of office. Things were in great confusion when he took office, and he had had a great deal to do in setting matters right. He could personally testify to the attention of the President to the business of the Council, and to his courtesy in the performance of the duties of his office.

Mr ELLIS seconded the motion, which was unanimously agreed to.

The PRESIDENT, in acknowledging the vote of thanks, said he had always received the support and co-operation of the members of the Council; and felt great gratification in having been the humble instrument in their hands in doing that which was considered necessary, under the circumstances, to be done for the benefit of the College.

The proceedings then terminated.

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In the evening the members dined together at the Freemasons' Tavern. The President, Professor Simonds, occupied the chair, and was supported by Dr Sharpey, Dr Alfred Taylor, Mr Quain, Mr Wilkinson (the Principal Veterinary Surgeon of the Army), Professor Spooner, Mr Goodwin, &c.

On the removal of the cloth, the PRESIDENT said—The first toast invariably drunk in the assemblies of Englishmen is, "The health of the Queen." (Cheers.) I am quite sure I shall only express the feelings of the profession to which I belong when I say that we sincerely sympathise with Her Majesty in her retirement, and that we trust that the events which have recently taken place will soon bring her forth again among her people. (Cheers.) The toast having been duly honoured,



The PRESIDENT said—Gentlemen, the next toast to which I shall direct your attention, is that of “The health of the Prince and Princess of Wales, and the rest of the Royal Family.” It can hardly be expected that I should say anything upon a toast of this kind. It is one which comes home to the heart of every Englishman, for we look upon the Prince and Princess of Wales as “England’s hope.” I have no doubt that the education which the Prince has received from his late lamented father and from his mother, is one which is well adapted to fit him for the distinguished position which he will hereafter occupy in this nation. With regard to the Princess, she comes at any rate to us as a lady fitted in every way to be the wife of one of England’s princes. I saw the other day mention made of a circumstance which seems to me to speak volumes as to the solicitude which the Queen feels with regard to the Prince and Princess. Very recently she paid a visit to the infirmary at Windsor, for the purpose of seeing an aged domestic upon her dying bed, and she took care in that visit to be accompanied by the Princess of Wales, thereby, I think, setting her one of the best examples, showing her that the Queen of England was not above going among her people, and not only so, but that she was willing to visit her humblest domestic when upon a dying bed. With such an education, and such an example before them, we may reasonably hope that both the Prince and Princess are in a fair way of preparation for that distinguished position which they are destined to occupy. I trust, however, that it will be a long time before we shall have to look upon the Prince as King of England. (Cheers.) The toast was drunk with all the honours.

The PRESIDENT—Gentlemen, the next toast upon my list is one in which we shall feel some considerable interest as members of the veterinary profession, “The Duke of Cambridge and the Army.” I say we feel some interest in this toast, because you are all mindful of the fact, that the Army is a means by which very many of the members of our profession find employment, and are introduced into the very best of society. (Hear, hear.) We feel also a deep interest in this toast, because many members of the profession who are not connected with the Army directly, are still indirectly connected with it. There are many troops of Yeomanry Cavalry in different parts of the country, and to each of them, I believe, a veterinary surgeon is attached. We are to-day honoured with the presence of one who occupies a very distinguished position in connection with our profession, and also with her Majesty’s service; I allude to Mr Wilkinson, the Principal Army Veterinary Surgeon. I also see on my right veterinary surgeons who did honour to themselves during the late war in Russia, while we were for so many months before the walls of Sebastopol. I need not particularise those individuals; but there is one gentleman upon my right, to whom I cannot but refer, who calls himself a veteran in the service, our friend Mr Robinson,—(cheers)—a gentleman, I believe, who has at any rate seen as much service, if we may judge from his appearance, as any one now present. Whether he has ever en-



countered any severe engagement of course I cannot take upon myself to say ; but I have no doubt, if he has ever been placed in such a position, he has been the last to surrender. With regard to the Duke of Cambridge, we know that he does all that he possibly can in the position in which he is placed to promote veterinary science. He not only takes care that the different regiments shall, as far as possible, be provided with veterinary surgeons who will do credit to the profession to which they belong, but I may remark that he is connected with the veterinary college as president of that institution, so that we have quite enough to assure us that the Duke of Cambridge takes a deep interest in the veterinary profession. I will call upon my friend Mr Wilkinson to acknowledge the toast.

Mr WILKINSON having been called upon by the Chairman to return thanks for the last toast—All I can say is, that he has fallen far short in the expressions he has used, strong as they are, with reference to the feeling with which his Royal Highness is animated towards our profession. I have the happiness of a personal intimacy with his Royal Highness, and I scarcely ever meet him without his asking me how we are getting on, not referring to the Army in particular, but to the profession to which he feels that he in some measure belongs as President of the Royal College. With reference to the Army, I think it is out of my province to say much about it; but I can say, and I am sure I shall be borne out by every one who has seen any branch of our science, that it was never in so efficient a state as it is at the present time. I believe the British Army, though not so numerous as the armies of other nations, is in a more efficient state than any other Army I have seen; and I believe that arises entirely from the zeal that animates every individual who is connected with a regiment or a part of a regiment. The machinery works well, and every body is anxious to do his duty, not only for his own sake, but for the benefit of the country to which he belongs. With regard to that branch of the army to which I may more particularly allude, the veterinary department, it has its duties to the Queen, to the country, and to the profession. I believe every one who has watched the career of the veterinary surgeons of the army of late years will acknowledge that we are not falling behind our professional brethren in civil life. It has been my duty, and will continue to be so, to do all in my power to raise the social position of the members of our profession. As long as I have anything in the shape of power, it shall not be lost in my hands, if I have the opportunity of protecting the interests of the profession, and, at the same time, elevating its social position. The facilities now within my reach are very great compared with what they were when I first entered the service. Of late years, you are aware, we have had great improvements in our army establishments, which have enabled me to offer better terms, and thus to secure the best materials which our schools produce in the shape of young gentlemen entering the service. I hold this to be an example of what I have always maintained, that if we could only improve the primary educa-



tion of our candidates we should hold a position in society, which I hope very shortly we shall hold. I do not see why we should not do so. I see men who have had education, and who have been in practice, and have been regarded as one of themselves by the gentry of this great country. I do not see why this should not be the case with all, or perhaps not all, because there are no doubt black sheep in every community; but we have a great work, and it is a work which must be aided by every individual member of the corporation. The main thing we have to do is, by elevating the education of our members, to elevate their social position. When we accomplish that we shall have no difficulty in getting men as well educated as those who enter the medical profession. I believe that many persons who now enter the medical profession having a love for horses would come into ours, but that they do not like the idea of going a step down instead of keeping a level which they have already reached. I thank you sincerely for the compliment you have paid us, and I assure you that no effort shall be wanting on my part to promote those interests which, through the army, affect the general body of our profession. (Cheers.)

Mr ERNES—Mr President and Gentlemen, I regret to have to inform you that this toast was not originally placed in my hands, and that the gentleman who would have been able to do justice to it has been obliged to leave the room. I am somewhat of a volunteer, and I hope you will bear with me in the few words I have to say. I might have had a great deal to say if I had been better prepared, because I think this is a very important toast. When I tell you that the College of Physicians has now existed nearly 300 years, and when we look back at the progress they have made up to the present time, I am sure you will rejoice with me in that advance. I sometimes look in at the College of Physicians, and I have heard some very interesting lectures there. Last year I heard some lectures on the liver by Dr Beale, and you know that we have in this country a great deal of what is called steatorrhea of the liver. Another course was upon the nerves, delivered by Dr Ratcliffe, and I was very much amused at the theory the lecturer broached, which certainly had in it the element of novelty. He mentioned in his lectures that everything depended on the electro-negative or the electro-positive, and that we thus could account for a great many phenomena which we have been unable to solve up to the present time. I hope the time will come when the College of Veterinary Surgeons will have a place where lectures can be delivered, and that they may investigate scientific matters connected with their profession, just as the College of Physicians do. I believe that the College of Physicians stand second to none. I am acquainted with many Continental institutions, the *Ecole de Médecine*, and others, and I may say that I have never seen anything that exceeded what is done in this country. With regard to the College of Surgeons, I think that is a misnomer; those gentlemen are also physicians. On the Continent, surgeons are nothing but surgeons, and simply attend to wounds and



broken bones. Here surgeons are generally practitioners, and there is nothing that escapes them; they contend with every disease and every malady, and, as we know, they labour under very great difficulties. We, as veterinary surgeons, have no difficulty in making our post-mortem examinations, we might make them, if we choose, almost every day. Not so with surgeons, they have the greatest difficulty in that respect, and meet with constant opposition. Whenever we have a disease of an interesting nature, we always investigate it, and tell whether we are right or wrong in our treatment. I believe the surgeons are not quite so ancient as the physicians, but they can trace their origin, I do not like to say to the barber-surgeons, but I am sure they will not be ashamed of even that when they look on the progress they have made since that time. I beg to give you "The health of the College of Physicians and the College of Surgeons." We are honoured by the presence of some of these gentlemen amongst us to-day, who are eminent in their profession as teachers and medical men.

Mr QUAIN, in acknowledging the toast, said, I am exactly in the same position as the gentleman who preceded me. For my worthy friend who sat at my right, a distinguished member of the College of Physicians, who was to have returned thanks for this toast, has been unavoidably obliged to leave the room. Speaking on the spur of the moment, let me say that I do not see why there should not be the greatest possible sympathy between the College of Veterinary Surgeons, and the College of Physicians and the Royal College of Surgeons. Their anatomy is very nearly the same, their physiologies are quite identical, their pathologies are identical, and the practice of one harmonises very much with that of the other, so that I do not see why there should not be the greatest sympathy between them. Gentlemen, I am more than thankful to you for the honour that you have done these old corporations in drinking this toast.

The PRESIDENT.—The next toast, gentlemen, to which I will call your attention, is one which I am sure you will drink, as we say, in a bumper. It is the "Court of Examiners." And I am sure I need not tell you how much, as a profession, we are indebted to the Court of Examiners for so kindly undertaking the task which they do undertake, and for testing, in the efficient manner that they do, the candidates sent up to them from the different schools. It has been said that we owe, and I am quite ready to admit it, a considerable debt of gratitude both to the College of Physicians and to the College of Surgeons, for having from the earliest times done all that lay in their power to promote the onward progress of the science to which we are attached. You will see this the more forcibly when I tell you, that until the obtainment of our charter the examination of our pupils was entirely entrusted to the care of physicians and surgeons. There were some members of our profession at that time who thought that the College, having existed for a number of years, (for it was established in 1790 or 1792, and we were not an incorporated body



until 1844), there had arisen amongst ourselves men quite competent to examine certainly upon the practical branches of the profession. There were some members who entertained that idea, and rightly so, and there were others amongst us who thought that we might dispense entirely with what was called the medical section of the Board, but I am sure if the strongest advocates for that system were alive now, they would see that a considerable advantage has arisen from our being united with physicians and surgeons in our examinations. We can boast, I think, of that which very few professions can boast, in having associated with us as examiners gentlemen who possess not only an English, but a European fame. (Hear, hear.) In looking over the list, which I did only this morning, of those who have acted as examiners, belonging both to the College of Physicians and the College of Surgeons, I found the distinguished names of Dr Fordyce, Dr Bailey, and Dr Babington (father of the present Dr Babington); and shortly afterwards Dr Pearson, Dr Paris, Dr Cook, and Dr Bright; and we can now boast, which we are exceedingly proud of doing, of having on our boards Dr Sharpey. (Cheers.) In the Scotch section we have men no less distinguished for their scientific knowledge as physicians, namely, Dr Dunsmure, Dr Begbie, and Dr Struthers. And if I go from the College of Physicians to the College of Surgeons, I find amongst those who assisted in the infancy of our profession the names of Clive, Sir Astley Cooper, Wilson, Abernethy, Hume, Travers, Cruickshanks, Liston, Bell, Brodie, Green, Bransley Cooper, and Jolly, and last, though not least, I may mention our friend Mr Quain. (Cheers.) I think I have shown you that these professions do take a considerable interest in the profession to which we belong. They have shown it from the earliest times to the present moment, and I am sure you will agree with me in thinking that we are now under the greatest possible obligation to those who have given up so much of their valuable time to advance our interests. As a teacher, I may be permitted to say that it matters not how perfect our teaching may be, it can be of no use unless there is a perfect examination. The pupils must be sent to a properly constituted board to be tested, and if they are improperly taught we know the proof of it will be in the rejection of many of the pupils; not that that would reflect entirely upon the teachers, because we all know there is a diversity of talent amongst us, and that with the best instruction all will not pass. I am sure we are under the greatest possible obligation to these gentlemen, and I trust that we shall happily continue to be right with them as we now are, for many years. I ask you to drink the health of the Court of Examiners. (Cheers.)

Mr QUAIN—I am very sorry again to appear before you in a vicarious position. The Chairman of the Court of Examiners, Mr Brande, is unavoidably absent, or it would have been his duty and pleasure to respond to this toast. I confess that, seeing the way in which you have received this toast, I am surprised at your good nature, and for this reason, that examinations have become so com-



mon, that it has been proposed by some men, I suppose in jest, to divide men into the examiners and the examined. I suppose, therefore, that many of you have been examined, and certainly you are very kind to the examiners. I have a very arduous duty to perform, because I have to return thanks for men who occupy a deservedly prominent position in this country. On my left I see an anatomist and physiologist who is acknowledged to be second to none in Europe. On my right is a gentleman who is at the head of the public service, and most worthily occupies that office. Then I see two gentlemen, one in practice in London and the other in the country, and they are second to no two men in their profession. It is my arduous duty to return thanks for them, but I look to your good nature, and ask you to allow me shortly, but sincerely, to thank you for each and for all. (Cheers.) But I have now another duty to perform. Our duty as examiners is entirely a secondary one; unless you had very able teachers at your colleges, there would be very little use in your examiners. We can judge of the quality of the teaching in your school by some of the men who come before us; and we can say, that in anatomy and physiology, they answer us as well as any men who go to the College of Physicians or the College of Surgeons. (Hear, hear.) I have now to propose to you the health of your president. (Cheers.) I cannot, in speaking of him as president, forget that he is one of the distinguished teachers of your school. He is a man, too, who has occupied lately a very prominent position in the public service, and most creditably to himself. But to-day his claim upon us is of a different kind. We certainly owe a great part of the life that has existed amongst us this evening, and the comfort we have enjoyed, to the constant exertions which he has made during the evening. I ask you very cordially to join with me in drinking the health of your president.

The toast having been drunk,

The PRESIDENT said, I can assure you, gentlemen, I feel exceedingly obliged to you for the kind manner in which you have responded to this toast. I do not know that, as president of the college, I deserve much at your hands. At any rate, during my year of office, I have endeavoured, as best I could, to fulfil the duties of the station in which you have done me the honour to place me. If I have failed, it has been rather from want of ability than from want of will to perform the task. I confess I look rather humbly upon my own exertions, and feel that I have not done so much as I ought to have done. Nevertheless, I hope I have been actuated by a proper motive. When I went to the college as one of its teachers, I became an instructor in a branch of science which at that time was hardly recognised, and I think I may say that science now stands in a more elevated position than it did at the time of my appointment; but I doubt not that there are many men who could have fulfilled the task as well as myself. My labour has not been without fruit, and I trust that those who will follow me will build upon the foundation that I



have attempted to lay, and that the superstructure will prove to be something like an ornament to the profession. (Hear, hear.) I fear I have done but little to entertain you in the position in which you have placed me, but you are aware that we have been placed under peculiar difficulties. Here let me say that I wish the members of our profession had assembled in sufficient numbers to fill the large hall of this building, instead of dining in a room on the second floor. I have no doubt if we put our shoulders to the wheel we may bring about that result on future occasions. It was so during the presidency of Mr Field, when we were honoured by the presence of the Duke of Cambridge, the commander-in-chief of the army. When the office of president passed from the hands of Mr Field, it was filled by gentlemen who did not see, eye to eye with him, as to what ought to be done to place the profession in a prominent position; and hence another good example which he set was not followed, that of calling together the great and noble of the land (on whom we are, as a profession, partly dependent), and men distinguished in science and art, as on the happy occasions of the meetings at Red Lion Square, which assumed the character of *conversazione*. I certainly deeply regret to think that such meetings were allowed to fall to the ground. I mention this because it may be said that I have had an opportunity during my year of office of doing something in this way. I certainly had it in my heart to do it, and only regret that circumstances were such as to prevent it. I found that other teachers, when in office, had done nothing, and that gentlemen occupying a distinguished position who succeeded Mr Field did nothing, and I thought it would be hardly right for me, a mere teacher in the institution, to presume to call together men of science and distinction at a *conversazione*, when others, my superiors, had done nothing of the kind. It was partly on this account that I desired that we should dine together in this convivial way, and that these things should be mentioned, so that we might, all of us, determine to do better for the future, and that it might be seen by the way in which our invitation to the medical section of our board was accepted, how ready they were to support us in anything we might attempt. I think we have before us a pretty good assurance that this day we have laid a foundation upon which a superstructure may be laid. I trust that next year the president will be altogether unfettered, and will be able to follow the noble example that has been set by our friend, Mr Field. (Cheers.)

Mr WILKINSON briefly proposed "The Schools and Teachers," coupling with it the name of Professor Gamgee.

Professor GAMGEE replied.

Dr SHARPEY—Mr President and Gentlemen, this evening repeated allusion has been made to the connection of the medical profession with the members of your special profession to the Board of Examiners, but I confess I scarcely expected, when I entered this room, that it should have fallen to me to bring before you what may be called the

toast of the evening. It is a toast which I should feel very great diffidence in proposing, were it not one which speaks for itself. It is often said that "good wine needs no bush," and I am sure when I tell you that the toast I have to propose is the Veterinary Profession, you will at once see that my task may be a very easy one. I think it is a matter of very great congratulation to us that the veterinary profession is now fairly established on a scientific basis; and I cannot but feel that this is in a very great measure owing to the successful labours of the Royal Veterinary College, and, in later years, to the establishment of the College of Veterinary Surgeons. In looking at the paper before me, I see there is something like a complaint, and the expression of a feeling and reproach that of all the persons engaged in the practice of the veterinary profession, only about a third have received testimonials of fitness from the Royal College of Veterinary Surgeons. Now I would take leave to observe that all professions have to go through certain stages of progress. The medical profession, or, as I may be allowed to call it, profession of anthropological medicine, has had to pass through these stages. There was a time when there were no such things as teaching colleges or examining boards—a time, nevertheless, when men of real genius stood out from their fellows, and earned a vast reputation in the world. We may refer in our own profession to the time when Hippocrates and Galen flourished, and in later times we may refer to such men as Vesalius and Ambrose Paré. There has been always scope for individual genius to stand forth far beyond the rest, and for men to distinguish themselves and advance the study in which they are engaged. But it is quite true that at that time the vast majority of the medical profession, if I may so call it, were in surgery but barbers—in medicine but herbalists, with a certain smattering of learning, or rather pedantic learned jargon, which served only to cloak their ignorance. It is only in later time that the great body of the medical profession have been able really to claim to belong to a literary and scientific body. This has, no doubt, greatly been owing to the institution of associations, under legislative sanction, that have instituted examinations, and have given public attestations of fitness; and the great change that has occurred is not so much individual as in the general body of the medical profession. There has been a general advancement, a general tendency towards acquirement, practical and scientific, in their profession. Now the veterinary profession has to go through the same process. It has come a little later in the field, and it has for some time been going through this process. In the veterinary profession you have had very distinguished men long before there was any established bodies under legislative sanction. There have been men of distinction who would have been ornaments to any profession or science, men like Mr Coleman, Mr Clark, and various others far better known to you than to me, who have justly earned for themselves a great reputation in veterinary science, and science generally. But it must be admitted that, while, as in the general medical profession, you have had a number of men



pursuing the profession of veterinary medicine and veterinary surgery, they have been, for the most part, very little better than mere handicraftsmen. That must be the case for a time. This state of things, however, is gradually being changed, and it is matter of congratulation, that in the present state of the veterinary profession, the great majority of practitioners are men who have undergone some reasonable education; and in reference to one-third, at any rate, the veterinary body practising in England, that number at least have become members of the body corporate. I suppose it cannot be doubted that a great deal of this improvement that has been made in the veterinary profession is due, in the first instance, to the institution of the Royal Veterinary College. I am informed, by my friend on my right, that it has existed since the year 1792—that they have not only established a regular instruction in veterinary medicine and surgery, but that they have had regular examinations, and have given, without legislative sanction, attestations of fitness. No doubt this voluntary institution, as it might be called, has had a most beneficial effect in advancing the profession; but within the last twenty years, the Royal College of Veterinary Surgeons, incorporated by royal charter, has had legislative sanction for giving attestations of fitness, by which the regularly educated veterinary surgeon may be distinguished by the world from the irregular practitioner. I think this is a matter of very great congratulation indeed, and that a new era has been opened for the profession by the institution and by the labours of the Royal College of Veterinary Surgeons. As a member of the examining body, I feel that it is a pleasure to be associated, in the task of elevating the veterinary profession, with gentlemen of great eminence in the profession, and I think it is the duty of the practitioners of anthropological medicine to lend their best aid to the accomplishment of that great end. Let me observe, before I sit down, that there are many points of correspondence between the two professions, as has been alluded to by Mr Quain; and I feel, particularly in my own person, that I form a sort of uniting medium between the two. The physiology is the same in both cases; and, let me observe, that we are largely indebted for the progress of physiology as a general science, having no more special reference to man than to the domestic animals, on which we so much depend, to members of the veterinary profession. It is not for me to go into detail and specify all the instances of this kind, but there are two that occur to me particularly at this moment. First, I would refer to those remarkable experiments which were made by one of your body, Professor Hering, of Stuttgart, upon the velocity of the circulating fluid. He has furnished us with the only exact data we possess as to the velocity of the current of blood. Those were most valuable experiments that he performed some thirty or forty years ago, and I am glad to say that he is still alive, and able to repeat and confirm them. Another subject which is of very great interest to both professions, is one which has been only of late years in any way cleared

up, I mean the economy of the entozoon, and I must say that we are largely indebted to such men as Professor Röhl, of Vienna, Professor Haubner, of Dresden, for the light they have thrown upon that wonderful subject. I think it is our duty, henceforward, to endeavour to work together as far as possible in the promotion of that great common science on which the two practical professions are founded. The same laws prevail in the economy of man, and it is our duty to co-operate as largely as we can in promoting the investigation of those laws. It is not for me to say more, on the present occasion, in reference to the veterinary profession, except to remark that it is a subject of very great congratulation, that it is now fairly launched in a progress and in a line of advancement which cannot fail to place it high in the public estimation. I beg leave to propose "Prosperity to the Veterinary Profession." (Cheers.)

Mr ROBINSON proposed the next toast, "The Royal Agricultural Society." That society, he said, was highly esteemed in the country, and had the means of effecting great improvements in the cultivation of the soil and in the breed of cattle. He well remembered the first meeting at Oxford, where, amongst the animals exhibited, there was but a single sire, and the implements comprised two or three carts and waggons, and a few machines employed in agriculture. Contrasting that meeting with the one held last year at Battersea, the progress of the society would be seen to have been most remarkable.

Mr W. FIELD, jun., proposed "The health of the Council of the College."

Mr FIELD, in responding, said, that the Council had endeavoured to fulfil the duties of their office, and he hoped had done so to the satisfaction of the members. He trusted that the rising generation would bestir themselves in promoting the advancement of veterinary science, and succeed in obtaining a position for the profession which it had not yet reached.

Mr GOODWIN proposed the health of Mr Braby, and dwelt on the services rendered to the college by that gentleman in various capacities.

Mr BRABY, in acknowledging the compliment, said he was happy, as treasurer, to state that the finances of the college were in a more promising state than they had been in for some years. The duties of his office, he said, were very light, and he was only too happy if he was able to discharge them to the satisfaction of the members.

The PRESIDENT proposed the health of the country practitioners, to whom, he said, they were all indebted for the manner in which they upheld the dignity of the profession. The toast was coupled with the name of Mr Burley.

Mr BURLEY, in acknowledging the toast, said, that there was no class of men more anxious and zealous for the honour of their profession than the veterinary surgeons of the country. He contrasted the difficulty of obtaining instruction in his youthful days with the facilities at present afforded by the veterinary schools. He expressed the



gratitude he felt towards the medical profession for the assistance rendered by its members, and said there was no greater gratification experienced by the country practitioners than in coming to London once a year to do honour to their instructors, to whom they were so deeply indebted.

Mr BROAD proposed the health of the Vice-Presidents and Stewards.

Mr BROWN acknowledged the toast; while thanking Dr Sharpey for the manner in which he had associated the two professions, he thought there was a great deal yet to be done before the members of the veterinary profession could claim the position they really ought to occupy. He was sorry to say, what was forced upon him, thirteen years experience as a teacher, that there was a lamentable want of preliminary education in the students who presented themselves at the schools. He perfectly concurred in a statement he had heard made by a distinguished member of the profession, that there ought to be a preliminary examination; that it ought to be understood that a certain amount of general education was indispensable to every veterinary student. When that was the case, there would be a great improvement in the race of veterinary surgeons. Mr Brown urged the necessity of mutual forbearance on the part of the members of the two professions, and referred to an instance in which a surgeon had expressed to him his conviction that the navicular bone of a horse could be extirpated, grounded upon the circumstance that the astragalus had been successfully removed from the human subject. He advocated a reciprocity of modesty, and an abstinence from dogmatising in reference to general principles of treatment, which, however apparently identical, were often perfectly irreconcilable.

Mr ERNES proposed "The health of the Secretary, Mr Coates," and alluded to the arduous labours performed by that gentleman in obtaining the statistical information embodied in the annual report, in preparing an improved register, the county and military list, and in the other duties of his official position.

Mr COATES, in responding to the toast, said he had always felt a warm interest in the veterinary profession. He had done his best to fulfil the duties of his office, all of which were new to him; and he was deeply indebted to the President and other members of the Council for the kindness he had received at their hands.

Mr FIELD proposed "The health of the Visitors," coupled with the name of "Mr Burley, jun."

Mr BURLEY, jun., briefly acknowledged the toast.

The toast of "The Ladies" having, at the instance of Mr C. DICKENS, being duly honoured, the company separated about 11 o'clock.

## SPECIAL MEETING OF COUNCIL.

At a meeting of the Council, held the 18th of May 1863:—*Present*:—Professors Simonds, Gamgee, and Varnell, Messrs Wilkinson, Field, Withers, Lawson, Moon, Jex, Hunt, Robinson, Silvester, Burley, Ernes, Braby, and Secretary.

This meeting being called for the election of a president and six vice-presidents, the late president, Professor Simonds, was called to the chair. Mr Wilkinson then proposed, and Mr Lawson seconded, "That Professor Dick be appointed president for the ensuing year;" whereupon Professor Gamgee proposed, and Mr Braby seconded, "That Mr Ernes be appointed President."

After some observations on the merits of the respective candidates, the ballot was proceeded with, when Professor Dick was found to have five votes, and Mr Ernes nine. Mr Ernes was therefore duly elected.

Mr ERNES then rose and said—Permit me, gentlemen, to thank you for the very unexpected honour you have conferred on me. When I entered this room, I had not the slightest idea that my name would have been brought forward as it has. I can assure you, that so long as I occupy the chair in this College, I shall strive to do so impartially, and with an earnest desire to further the best interests of the Royal College of Veterinary Surgeons. I again beg to thank you for the distinction bestowed on me.

It was moved by Mr SILVESTER, and seconded by Mr FIELD, "That a vote of thanks be given to the late President for his urbanity and impartial conduct in the chair during the past year."—Carried by acclamation.

Professor SIMONDS returned thanks, and at the same time handed over to the President the official key of the Royal Charter and Seal.

The election of six Vice-Presidents was then proceeded with.

The following gentlemen were proposed—Mr Goodwin by Mr Robinson; Mr Harpley by Mr Burley; Mr Dickens by Mr Hunt; Mr Aitken by Mr Silvester; Mr Gardiner, Mr Harrison, and Mr Partridge by Mr Wilkinson; Mr J. C. Broad by Professor Varnell; Mr Joseph Gamgee by Professor Gamgee, and Mr Wardlaw by Mr Jex. The result of the ballot was—for Mr Harpley, 16, Mr Dickens, 13; Mr Goodwin, 12; Mr Aitken, 12; Mr Harrison, 10; Mr Gardiner, 9; whereupon Messrs Harpley, Dickens, Goodwin, Aitken, Harrison, and Gardiner were declared duly elected.

It was moved by Mr JEX, and seconded by Professor GAMGEE—"That Mr Coates be elected Secretary and Registrar for the ensuing year."

On the ballot being taken, Mr Coates was declared unanimously elected.

By order of the Council,

W. H. COATES, *Secretary*.



## PHARMACEUTICAL NOTES.

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**EUPATORIUM PERFOLIATUM.** — This plant is indigenous throughout the United States. The root is perennial, horizontal, and crooked. The stems are numerous, and of a greyish-green colour on the upper surface, and pale underneath. The flowers begin to blossom about August, and are of a white colour, or, according to some authors, sometimes purplish or blue. The herb has a slight odour, and an intense bitter taste. According to Rafines, it contains a peculiar brown, bitter resiniform substance, which he calls *Eupatorine*, and is soluble in water and acids, with the latter of which, both mineral and vegetable, it combines to form salts. The plant is said to be alterative, diuretic, diaphoretic, emetic, purgative, &c., and has been employed in colds, dropsy, fever, pneumonia, &c. It is said the Indians use it in intermittent fevers with success. Dr Anderson of New York has used it successfully in remittent and yellow fevers, in typhus fever, pneumonia, catarrhal fevers, cutaneous affections, dropsies. Dr Bargon of Pennsylvania praises it highly in cases of want of appetite consequent on drunkenness, and says, "In such cases I have used a cold infusion with evident benefit, and prefer it to any article I have hitherto employed; it very speedily restores the tone of the stomach, and no unpleasant effects follow its administration." Dr Lee has seen excellent effects from the cold infusion of the plant taken as a prophylactic in malarious districts against fever and ague; also as a stomachic tonic in the form of tincture. Dr Zolluckoffer thinks there is no indigenous vegetable production of the United States that is more deserving the attention of physicians than this; that it possesses medicinal virtues, which are admirably adapted to a variety of affections, and that, in conjunction with bitartrate of potass, it is one of the most valuable and efficient remedies in *tinea capitis*.

**GERANIUM MACULATUM** (*Alum Root, Crow-Foot, Spotted Geranium*).—This plant is to be found on the borders of damp woods, in hedges and thickets throughout all the states of North America. The root is perennial, fleshy, furnished with short fibres of a brown colour, mottled with green externally, and greenish white internally. The stem is annual, herbaceous, and attains to the height of from one to two feet. The leaves are of a pale green colour. The flowers are of a lilac colour, and blossom generally in May or June. The fruit is capsular, and contains five seeds. The root possesses an astringent taste. According to Dr Staples, it contains a large quantity of gallic acid, tannin, a red colouring matter which is stated to reside principally in the external covering of the root, resin, and a crystallizable vegetable substance. The active principle of the plant is imparted to water and alcohol.

This plant has been long regarded as a remedy in venereal affections, and the root is a powerful astringent. It has been employed for many years in chronic diarrhoea, chloræ infantum, chronic dysentery, hæmorrhage, &c. The powdered root is used in doses of from grs. xx to ʒss. It is also employed in the form of decoction made by boiling 1 oz. of the root in Oiss of water down to Oj.

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ON THE CALABAR BEAN AS A NEW AGENT IN OPHTHALMIC MEDICINE.—In the *Pharmaceutical Journal*, vol. xiv. p. 470, will be found an interesting paper by Dr Christison on the general properties of the “Ordeal Bean of Old Calabar,” and quite recently, D. Argyll Robertson (*Edinburgh Medical Journal*, March 1863) has investigated its properties as a new agent in ophthalmic medicine. D. Robertson observes:—For more than a year past I have recognised the numerous advantages that would flow from the discovery of a substance which, when applied to the conjunctiva, should produce effects exactly opposite to those well known to result from belladonna or atropine; which should stimulate the muscle of accommodation and the sphincter pupillæ as the above-named remedies paralyse them. With the view of discovering such an agent, I endeavoured to ascertain from experiments of my own, and from the writings of previous observers, whether any of the common vegetable principles possessed this property. These investigations were, however, productive of no satisfactory results, until my friend Dr Fraser informed me that he had seen contraction of the pupil result from the local application of an extract of the ordeal bean of Calabar. I resolved to investigate the action of this substance, and, above all, to ascertain whether it exerted any influence on the accommodation of the eye. With some difficulty I got a few Calabar beans, and, with the view of obtaining their active principles in a convenient form, prepared from them three extracts, of varying strengths, in the following manner:—The weakest of the three was made by thoroughly digesting gr. xxx. of the powdered Calabar bean in alcohol, carefully evaporating the strained fluid to dryness, and then adding to the residue ʒj. of water. This formed a muddy solution, of a light reddish brown tint. In strength, one minim of this solution corresponded to about half a grain of the bean. The second extract was formed by evaporating a portion of the first to about a quarter of its volume; so that one minim of this extract corresponded to about two grains of the bean. The third extract was the strongest, and was prepared like the first, except that the proportions differed; so that one minim of it in strength corresponded to four grains of the bean. With these solutions, I then proceeded to perform the following experiments,—in which I had the able assistance of Dr Grainger Stewart,—with the intention of elucidating the exact effects the Calabar bean is capable of producing on the eye.

Several experiments with this agent are then described, the details of which are too exclusively medical for our pages; but the following



are the conclusions arrived at by the author:—"These experiments prove that the local application of the Calabar bean to the eye induces—first, a condition of shortsightedness. That this is present, and the cause of the indistinctness of distant vision, cannot be doubted, as it is relieved by the use of concave glasses. The fact that objects appear larger and nearer than natural may be attributed to the induced myopia. And, second, it occasions contraction of the pupil, and sympathetically, dilatation of the pupil of the other eye. We further observe that raopine possesses the power of counteracting its effects, and, *vice versa*, that it is capable of overcoming the effects produced by atropine. The first symptom noticed is dimness of distant vision, and shortly after the pupil becomes contracted; the symptoms also subside in the same order,—first the derangement of accommodation, and then the affection of the pupil."—*Pharmaceutical Journal*.

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GLYCERINE PLASTERS.—At a meeting of the Obstetrical Society of London, March 4th, Dr Tilt drew attention to the fact that when 100 or 150 grains of common starch are boiled in one ounce of glycerine, the result is a very stiff glutinous compound,<sup>1</sup> which has no smell, and does not become rancid, and although sticking firmly to the skin, it can be removed and reapplied. Instead of ordering belladonna plaster, Dr Tilt prescribes three grains of sulphate of atropine to be rubbed down with a few drops of glycerine, then incorporated with one ounce of hard glycerine ointment, and thickly spread by the patient on gutta percha cloth, or impermeable cloth. Morphia and other alkaloids are prescribed in the same way.

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THE PHARMACOPŒIA.—Dr Burrows and Dr Farre, the one a member of the Medical Council, and the latter a member of the Pharmacopœia Committee, both said a few words at the last meeting of the College of Physicians on the subject of the Pharmacopœia. Dr Burrows did not give a hopeful account of its progress. He said that the determination come to in favour of the old-fashioned grain had caused a great deal of new work to be encountered, viz., the conversion of the committee's new-fashioned grain back into the old style. He, however, believed that the work was in progress, and had been much advanced. It appears that every alteration has to go the circuit of the three kingdoms; to be subjected, in fact, successively, to the Irish, Scotch, and English criticisms of the three sub-committees, sitting respectively in London, Edinburgh, and Dublin. This process, of course, gives rise to interminable alterations, suggestions, recommendations, joinders, rejoinders, replications, and so on. Dr Burrows said, also, that a part of the manuscript was actually in

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<sup>1</sup> [A similar preparation, as a proposed substitute for oils and fats, was first introduced by Mr Schacht, of Clifton, and published in this Journal, vol. xvii. p. 400.—*Ed. Ph. Journal*.]

print; but that as to when the work would appear, he could give no opinion.

Dr Farre, however, who, being on the Committee, should know most of the matters, gave a more hopeful view of things. He seemed to think that there decidedly was a chance of the work seeing the light during the present generation. The chief, in fact the only cause now of the delay was the circuit of the manuscript through the three kingdoms. He assured the College that the Pharmacopœia was steadily progressing; that a part of it was in print; and that the remainder was rapidly getting into the same state. It does not appear, by the way, that the delay has injured the College's pecuniary interests, for the Treasurer remarked that during the past year the College has netted L.26 by the sale of Pharmacopœias of the old kind.—*Brit. Med. Jour.*

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## MEETING OF A SOCIETY.

### BLANDFORD FARMERS' CLUB.

#### STABLE VENTILATION.

AT the last meeting of this Club, a paper on "Stable Ventilation" was read by Mr WILLS, V.S. He said:—I am convinced that no subject has a more intimate relation to animal life than ventilation, neither is there one that requires more consideration, nor, I think, is there one that gets less. Proper ventilation consists in the introduction of a sufficient quantity of pure air to keep up a due supply of oxygen, which has been absorbed, and in the removal of that portion which has become vitiated; to be perfect, then, it should be conducted on scientific principles, formed by calculations as to the demand. A few years ago, when a Commission was appointed by Parliament to inquire into the subject of ventilating dwellings, in their report they state—"We began the work by endeavouring to ascertain approximately the amount of fresh air required to keep a sleeping-room healthy. Various attempts have been made at different times to settle this amount scientifically, but nearly every experimenter has arrived at a different estimate of the quantity. These differences in opinion have arisen from not sufficiently considering the various offices which fresh air has to perform in the ventilation of dwellings, and from not looking at the practical rather than the scientific view of the question. One set of experimenters have based their calculations on the quantity of air required to dilute the carbonic acid, down to the proportion in which that gas exists in the external atmosphere. The estimates hence are very various, and differ to the extent of one, two, or even four times as to the amount of air required for health—a difference which proves how little is yet known scientifically on the subject." They go on to say—"The practical argument as to the amount of fresh air required to ventilate a room is, in our opinion, of far more weight than the mere scientific one. We find, for example, that nature has provided in the atmosphere unlimited extent and constant means of purification and of movement. The building of dwellings interferes with those natural conditions, by enclosing the air in confined spaces, saturating that air with impurities, and rendering it stagnant. It may be fairly argued, as, indeed has been proved by experience, that those dwellings are the most healthy in which the natural conditions of the atmosphere are most perfectly preserved. This being our object, then the first point to be considered is the quantity of air vitiated by a single horse, and how much he will require, in a given time, to keep



him in a healthy condition. To make this clear, I must enter a little into estimates, but I will promise to make them as short as possible. An ordinary healthy atmosphere consists of the following constituents:—Oxygen, 20·61 per cent.; nitrogen, 77·95 per cent.; carbonic acid, ·04 per cent.; watery vapour, 1·40 per cent. Now, the oxygen is the important ingredient which supports life, the nitrogen being only a diluter of the oxygen; the carbonic acid gas is in scarcely appreciable quantity, and that is produced by the process of respiration and combustion on the surface of the earth, by which immense quantities are continually being formed; nevertheless, the proportionate quantity scarcely varies, for this very gas, which is exceedingly destructive to animal life, is, as you know, the principal food upon which all the vegetable world lives, absorbing this carbonic acid from the air, and decomposing it, retaining its carbon, and giving off the oxygen, which is just what animals require. The destructive agency of this gas—viz., carbonic acid—on animal life, is well exemplified in certain places where large quantities are evolved from the earth, the most striking instance being the celebrated valley of Java, which, if any animal enters, he never leaves. If you are not familiar with it, I will read you a short but interesting account of this valley, given by an eye-witness:—"We took with us two dogs and some fowls to try experiments in this poisonous hollow. On arriving at the foot of the mountain, we dismounted, and scrambled up the side, about a quarter of a mile, holding on by the branches of trees. When within a few yards of the valley we experienced a strong, nauseous, suffocating smell, but on coming close to its edge this disagreeable odour left us. The valley appeared to be about half a mile in circumference, oval, and the depth from thirty to thirty-five feet; the bottom quite flat; no vegetation; strewn with some very large (apparently) river stones, and the whole covered with the skeletons of human beings, tigers, pigs, deer, peacocks, and all sorts of birds. We could not perceive any vapour or any opening in the ground, which last appeared to us to be of a hard sandy substance. It was now proposed by one of the party to enter the valley, but at the spot where we were this was difficult, at least for me, as one false step would have brought us to eternity, seeing no assistance could be given. We lighted our cigars, and, with the assistance of a bamboo, we went down within eighteen feet of the bottom. Here we did not experience any difficulty in breathing, but an offensive nauseous smell annoyed us. We now fastened a dog to the end of a bamboo eighteen feet long, and sent him in. We had our watches in our hands, and in fourteen seconds he fell on his back; did not move his limbs or look round, but continued to breathe eighteen minutes. We then sent in another, or rather he got loose, and walked in to where the other dog was lying. He then stood quite still, and in ten minutes fell on his face, and never afterwards moved his limbs; he continued to breathe seven minutes. We now tried a fowl, which died in a minute and a-half. We threw in another, which died before touching the ground. During these experiments we experienced a heavy shower of rain; but we were so interested by the awful sight before us that we did not care for getting wet. On the opposite side, near a large stone, was the skeleton of a human being, who must have perished on his back, with his right hand under his head. From being exposed to the weather the bones were bleached as white as ivory. I was anxious to procure this skeleton, but an attempt to get it would be madness." Any animal shut up in a close stable affects the purity of the air in those very matters which are injurious to his health—viz., he withdraws oxygen by the process of respiration, and thus diminishes its proportionate quantity. He replaces the oxygen by an equivalent of carbonic acid, increasing its proportionate quantity. By the process of exhalation from the lungs and skin he increases the proportion of water in the air. In the moisture exhaled from the body is a quantity of excreted animal matter, disengaged from the system, which, were it retained, would be fatal to health and life. The respired air, therefore, is found to differ very much in composition; it has lost from four to five per cent. of its oxygen, and has acquired four or five per cent. of carbonic acid, and a quantity of watery vapour. It has been calculated that the horse takes into his lungs at each inspiration 100 cubic inches of air; at the rate of eight respirations per minute he inspires 48,000



cubic inches of air per hour. Now I will not go into details of this kind further than I can help, but at the very least the quantity of carbonic acid evolved in 24 hours may be calculated at 24 cubic feet containing 45 oz. of solid carbon. It must, however, be remembered that the carbonic acid is not the only injurious product. The exhalations from the skin and excretions, defective drainage, &c., all combine to produce a vitiated atmosphere. The amount of the cutaneous perspiration and the pulmonary transpiration is on an average 15lb. weight daily, holding in solution a quantity of animal matter which very readily putrifies; and hence the moisture becomes the vehicle for a subtle aërial poison, which, when breathed for some time, poisons the blood and predisposes to disease. Now, having arrived at these data—that a horse passes through his lungs 800 cubic inches of air per minute, that in twenty-four hours he makes twenty-four cubic feet of carbonic acid, and that from his lungs and skin he adds about 15lb. weight of watery excretions—we will endeavour to adapt them practically. Keeping to my promise not to bore you with uninteresting scientific details, I will merely say that chemistry tells us that at least 1000 cubic feet of air per hour are required by a horse for the mere purpose of diluting the carbonic acid and water given off from the body to the same standard as they exist in the atmosphere itself. But chemistry takes no cognisance of these aërial poisons eliminated from the skin and lungs, and which in stagnant air are perfectly cognisable to the senses, even after the air has been diluted to the extent stated. Indeed, the object to be served by ventilation is primarily the dilution and removal of those poisonous exhalations; and if this be secured, the carbonic acid and water will be removed at the same time. Calculating on the experiments in reference to human beings made by the Commissioners, 6000 cubic feet of air should be supplied to each horse per hour. Now, in a stable of that capacity—viz., 6000 feet, or about 33 by 15 by 12 feet—you would place five horses, therefore the ventilation should be so contrived as to change the air five times every hour; remember, I do not say that the space I have mentioned—viz., 1200 cubic feet of stable to each horse—is sufficient; I much prefer that the horse should have more stable-room, for then it would not be necessary to change the air so often, but I do not expect that you are going to pull down your stables, or build more, so I am making my calculations on readily practical grounds. It would be a different thing if you were about to build; I should then recommend twice as much space for each horse as that I have mentioned. Now, having settled that a horse having 1200 cubic feet of stable-room requires that the air should be changed five times every hour, the first question that arises is, how can this be done? It is a well-known fact that air, like water, is governed by certain laws, and that its ingress and egress into and from rooms can be regulated by the observance of certain conditions. Respired air, warmed by being taken into the lungs, is specifically lighter or takes up more space than pure, cold atmospheric air, it therefore ascends towards the ceiling, where it becomes condensed, and subsequently descends and mixes with the air of the whole room; in obedience to the remarkable law of the diffusion of gases, a portion escapes by any opening it can find at the top of doors; windows, &c., but if there is a fire, most of it escapes by the chimney. This, by itself, is sufficient ventilation for a large room. Again, fresh air enters by doors, windows, &c. It has been calculated that eight cubic feet of air per minute will pass between each window frame and the sash, but free entrance and exit must be provided for the air; our ventilation must be self-acting in fact. Stables should have plenty of ventilators in the ridge of the roof, and a number of openings in the walls above the horses' heads; the heated air would then escape by the highest openings, and cold air enter by the lower ones, and immediately take the place of that escaping above, thus not blowing down on the horses at all. If this plan were thoroughly carried out, I think it would be sufficient; but where, from a loft being over, this plan cannot be adopted, and you could not conveniently carry ventilators through the loft, try two rows of holes in the walls, both above the horses' heads; and if this is not sufficient, holes must be made along the bottom of the walls furthest from the horses. Do not be afraid of the draught; it has been proved that animals in a state of nature



require very little more than food and shelter to preserve them in a healthy condition; but go into almost any stable you please, and what do you think of it? I suspect you will find more than shelter there; it probably is so warm and stifling that you can hardly breathe. You look at the ventilators, if there are any, and you will find them stuffed with straw, and every crack or hole in the wall or window effectually closed, for fear the horses should take cold. Well, gentlemen, continue this, and you will continue to have influenza, coughs, ophthalmia, and a variety of other diseases in your stables, and perhaps employ me to cure them; but if you wish never to have a case of the kind, take my advice and thoroughly ventilate—far better have too much air than too little. As I said before, you must have plenty of pure at any sacrifice; however inconveniently the ventilators may be placed, they are better than none. I would rather have a stable full of cracks and holes—what you call tumbling down—to preserve the health of a horse, than the majority of stables throughout the country. There are times when, from the heat and stillness of the external atmosphere, the ventilation becomes stagnant; in such cases of course you must have adventitious aids, opening all your doors, windows, &c. I hope I have said enough to satisfy you that a horse confined in a stable destroys rapidly a large proportion of atmospheric air, as to render it necessary that he should have a much larger space than has hitherto been allotted to him; that the system of ventilation must be self-acting, and of sufficient capacity so as to insure the necessary supply of pure air; and that windows and doors should only be looked upon as adjuncts to the self-acting system during times of extreme heat and stagnation of the outer atmosphere, and not as the main provisions for ventilation. The evils attendant on the want of sufficient ventilation are only too well known to those whose duty it is to inquire into the causes of disease, but which are little suspected and rarely admitted by stockowners; but I assure you that a large number of the diseases affecting animals can principally be attributed to, or are promoted by, an accumulation and stagnation of the exhalations of the body. It is of little use running over a list of these. Take away the cause, and the effects will cease. Now, gentlemen, I will not take up much more of your time, but I have another remark or two to make on the prevention of disease, which was suggested to my mind at our first meeting this year, held for the purpose of arranging the course of lectures. When I was desired to prepare one, I expressed a wish that a subject should be given me to bring forward, when a gentleman present said, “I wish you would tell us, Mr Wills, how to keep our stock always healthy;” a very modest request indeed, and certainly nothing could be more desirable. The remark was then made, “that would be against his own interests.” I assure you gentlemen, I have no desire that any of you should lose your stock at all, and I will do all in my power to prevent it; but as to being able to tell that in a lecture, it is out of the question. But I can tell you how to reduce your losses very considerably. I will quote a few extracts from a paper lately read before the Royal Society of Dublin, by Professor Gamgee, of Edinburgh. In reference to the prevention of disease he says, “Besides the losses by fatal diseases, a heavy loss is incurred annually by maladies which do not kill, but which deteriorate the condition of stock, and lead to great expense of time and food; for instance, this is the case when epizootic aphtha (or foot-and-mouth disease), influenza, diarrhoea, &c., prevail. At present the general impression is that there is no serious reason for taking into consideration the losses resulting from such causes, and no effort is made to counteract them. A remedy has been most successful elsewhere, and it consists in applying veterinary knowledge to the prevention, rather than the cure, of disease—in having able men to investigate, at any moment, the causes of mortality among stock. My suggestion,” he says, “is that the public should combine in any scheme sufficient to meet the evil. If you are incredulous as to the possibility of preventing disease, hesitate not to prosecute inquiry, to attempt experiments, and then aid in suggesting good measures, if others propose bad ones.” I think, gentlemen, you will acknowledge that there is no better way of effectually arresting these diseases of a local nature, affecting many animals consecutively, whereby



you are such great losers annually. It is not possible to lay down any fixed rules for the treatment of such cases, for many of you know to your cost that frequently what answers well one year fails signally the next. How common is the axiom that the knowledge of a disease is half its cure; if this is true generally, how much more so is it that the knowledge of the cause of disease may insure its prevention. Now, my suggestion is derived from Professor Gamgee's advice, and it is this (but do not set it down to selfish motives on my part) that properly qualified persons should be appointed to investigate the cause of epizootic disease which may break out in any locality, to suggest the means of preventing its extension, and apply appropriate hygienic or medical treatment of the affected stock. I have not the least doubt that by such a provision the mortality and expense to the owner would be reduced one-half. I need say no more on the subject, gentlemen, but shall be satisfied if any one present derives any benefit from what I have said.

Mr W. SPOONER said that it was exceedingly necessary that ventilation should be more attended to than it had been. Horses give off very large quantities of carbonic acid in the process of respiration, which gas, when present in excessive quantity in the air, is very fatal to animal life. Some time ago, a striking instance of this occurred on his own premises. He had a tank under ground in which the gas liquor of some of the Southampton gas works is collected and used for the purpose of obtaining ammonia. His men had a quantity of weak sulphuric acid which they wanted to get rid of, so they emptied it into this tank, and closed it. Shortly after a man went to dip some water from a well about a dozen yards off, and he fell forward on his face; another went to see what was the matter, and he fell down over him; a third then came up, and, feeling a suffocating sensation, ran back, and seeing some person coming by pointed to the well, for he could not speak; the men were quickly rescued, otherwise in a few minutes their lives would have been sacrificed. The carbonic acid had been produced by the action of the sulphuric acid on the gas liquor, and making its way through the earth, filled the well and overflowed it; for, being a very heavy gas, it rolled along the surface of the ground to some distance. He recommended that stables should be ventilated by both low and high openings, and that earth should be placed to the depth of a foot below the horses, instead of paving, it having the property of absorbing immense quantities of ammonia it is the best natural deodoriser, and would be afterwards very valuable as a manure—nearly as good as his superphosphate, in fact—and would not require to be changed more than once in six months. A great number of diseases of the eyes, &c., are frequently produced by defective ventilation. During the Peninsular war, some horses in a transport, in consequence of bad weather, were closely confined for some time, the hatches being battened down; when they were landed, all were found to be either glandered or farcied. He was satisfied that many diseases would be entirely prevented by effective ventilation.

Mr R. EYERS said he quite agreed with what Mr Wills had said. He frequently found it scarcely possible to breathe on entering some of his stables of a morning, but it was of no use to talk to the men about it; if he insisted on having the ventilators and windows opened, the next day they were closed as before. Another source of the impurity of the air arises from the stables not being properly cleaned out every day; the men take away only what lies on the top, and leave a great deal of dung between the pitchings; this, he was sure, had much to do with rendering the air impure. He believed horses would be far healthier if they were not kept so warm as is usual; for his part, he will never have another cloth used in his stables.

Mr SCOTT said that he had a stable built of wood, about twelve months ago, and as the boards only lapped over each other, of course plenty of fresh air was constantly supplied; the consequence is, he has had no disease among his horses since, whereas before something was the matter almost continually.

Mr HARDING, Mr G. KEYNES, Mr W. FOOKES, and several other gentlemen took part in the discussion, and the proceedings terminated with a vote of thanks to Mr Wills.



## PERISCOPE.

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## OBSERVATIONS ON RABIES IN SHEEP.

At the annual meeting of the State Agricultural Society, a paper, recounting the complete history of several cases of rabies in a flock of sheep, was read by the Hon. Henry S. Randall, containing full details as to each animal attacked, from the inception to the termination of the disease, from notes made daily during its entire progress. As the fullest and most carefully prepared record of the kind extant, this paper possesses an especial interest, aside from that which ever attaches itself to so fearful and mysterious a complaint. Mr Randall's design was to report all the symptoms and results connected with it, whether at the time apparently important or not—thus presenting a complete view of the case, and leaving it for farther observation or individual judgment to determine the relative importance of the facts stated. The sheep belonged to the flock of Mr H. P. Randall, and were bitten by a mad dog on Christmas Eve, 1862—the flock consisting of about 300 ewes, three years old last spring, and in lamb. They were bitten mostly about the head, on the nose and ears, the wounds healing rapidly, and the existence of the disease being unsuspected until the 12th January. On the 14th, Mr Randall's observations commenced, and were continued daily until the 29th—the results of each day's examination being written down on the spot. The different cases were found to present some variations in the minor developments of rabies, "owing perhaps to individual peculiarities of the different animals;" but, as a whole, a remarkable identity was observable in the general symptoms throughout, and we copy below Mr Randall's careful summary of the conclusions attained:—

## FIRST SYMPTOMS OF RABIES.

Assuming that the rabid sheep which I have designated as No. 3 was seen by me on the first day of the attack of the disease—a fact of which I entertain no doubt, after comparing her subsequent symptoms with those of the later ones—and estimating the two first numbered cases to have had the average duration of the other five,<sup>1</sup> the period of "incubation" in the whole seven (that is, the period between the sheep's being bitten and the appearance of rabies) ranged from fifteen to twenty-six days, and averaged about twenty-one days.

The first observed symptom in every case, which was seen at or near its commencement, was the same—viz., ungovernable apparent salacity, manifested not according to the sex of the patients—all of which were ewes, and supposed to be in lamb—but in the manner in which the ram exhibits sexual heat. This resemblance extended to the minutest particulars in movements, postures, and in that characteristic note with which the male animal expresses desire as he approaches and importunes the female. In no instance did the rabid ewe show any of the usual indications of rutting. She incessantly attempted to ride her companions, but uniformly manifested rage, and turned and fought the one attempting to ride her. This propensity remained active until the sheep became too weak to exercise it, and never entirely ceased.

In all the cases, rumination was totally suspended from the first visible attack of the disease until death; and throughout the same period, all the patients, with perhaps one exception,<sup>2</sup> were not seen to consume an ounce of natural food, though the choicest was repeatedly offered to them—in some instances, where they had been purposely deprived of it for twenty-four hours. They, however,

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<sup>1</sup> So little is known of the facts in the first case, which terminated fatally on the 13th January, that I did not number it, nor have I included it in this summary.

<sup>2</sup> No. 7 was seen for an instant attempting to ride another sheep the afternoon before the disease apparently was fully developed. She resumed eating hay while I stood looking on—I observed her eating for perhaps five minutes. When I next saw her she was rabid.



manifested a depraved appetite. All of them frequently ate wool from each other, and gnawed the rails of their pen. One was seen to eat dung-balls from the breech of another—another, snow, which had just been saturated with sheep's urine—and two eagerly to lick the mucus and saliva from the nose and mouth of a dead one, and afterwards the *post-mortem* discharges from the same parts. They preyed upon every substance within their reach which was unnatural as food, except the flesh of their dead companions. Their eating, as I have termed it, was attended, so far as could be observed, with no regular mastication. When they gnawed the rails of their pen, they held their heads down and extended, so that it could not be seen whether they masticated or not. They did not pause and raise their heads to do so, but continued intently gnawing. The only evidence I had of their swallowing the wood was that considerable quantities of it were bitten from all parts of the pen, and none of it could be found on the snow underneath; and as some of the wood gnawed was of a red, and much of it of a dark colour, it would have been readily visible there. When they ate wood, dung-balls, and the like, they generally snatched them as if in haste, and in all cases swallowed them after two or three rapid movements of the jaws, which were apparently only made to place the substance in a situation to be forced into the œsophagus.

No exhibition of thirst was observed in any case, and, on the other hand, no dread of water when it was placed in a pail before them. One played in the water with her nose, as a horse is often seen to do, and drank a little without apparent difficulty. One or two were seen to nibble a little ice or snow on two or three occasions.

The evacuation of both dung and urine was very slight. The fæces appeared natural in colour and consistency.

I came to the conclusion, after considerable hesitation, that the disease in its earliest stages, and perhaps throughout, was accompanied by a slightly unnatural expression of the eyes, which, for the want of a more expressive term, I have called glistening. But I do not think any one could safely undertake to select a rabid sheep from a flock, even if one was known to be there, by this indication alone. Yet, obscure as is this symptom, it is the only one which distinguishes the rabid sheep in appearance from the one in perfect health, until emaciation and the other later effects of the malady exhibit themselves. The animal is as gregarious as ever—eats its food and ruminates as placidly as usual—looks as plump, bright, and healthy as any sheep in the flock; half-an-hour later, with looks entirely unchanged, unless in the trifling particular named, it is moving around restlessly and incessantly among its companions, struck by a malady which has transformed the habits of its sex<sup>1</sup>—which no human power can arrest or even palliate—and which will know no respite until terminated in a miserable death.

#### A PUGNACIOUS DISPOSITION MANIFESTED THROUGHOUT.

The subsequent occurrence and progress of the symptoms, in the cases observed by me, were about as follows:—The rabid sheep both exhibited and provoked extreme rage when they were first put in a pen with other rabid sheep. They fought or pursued each other fiercely. But this mood soon subsided in the new comers, and for the next twenty-four hours they remained comparatively peaceable, at least unaggressive; but they were ever ready to fight on being ridden. On the second day, the depraved appetite manifested itself, and they began to rub their heads against fences, walls, &c., and to scratch them with their own hind feet, leading to the inference that they were suffering severe cerebral pain. The part of the head invariably rubbed was that over the parietal bones. On the second or third day, the scars left by the dog's teeth looked red and inflamed. The sheep were more restless and irritable. They frequently assailed their companions without any provocation. They fiercely butted, and two of them actually bit at a stick as often as it was pushed against or towards them. On the third or fourth day, they rushed at a man if he entered their pen,

<sup>1</sup> At least so in the case of ewes.



and bounded forward and dashed against the fence which separated them from him, on his thrusting a stick at them. Three of them charged the fence if only a hat or a handkerchief was shaken towards them. Two were so ungovernably fierce at times that they sprang at a bystander if he uttered a sound or merely approached their pen. They bounded forward when they made these assaults, most of them emitting that loud snuffing sound (caused by a violent explosion of air through the nostrils) by which rams, bulls, &c., often express their rage at the approach of some strange object. Two of them opened their mouths, gnashing and threatening to bite whenever they attacked a man or a stick, but I did not see them offer to bite when fighting their companions. On the fourth or fifth day the wounds of a portion of them more or less reopened. On the fifth or sixth day they began to exhibit considerable weakness, and most of them displayed less ferocity. No. 1, however, remained indomitably savage to the last; No. 3 remained so until near death; and No. 6, after a temporary lull, became more deeply re-excited and ferocious, and remained so until death. These three last-named sheep would rush at a man, a stick, or another sheep, when they were so weak as frequently to fall before reaching their object; and as soon as they could rise they would renew the attack. They and others frequently fought each other when in this condition, constantly falling, and some of them uttering short bleating sounds, or groaning piteously when they were hurt.

Their voices on such an occasion were more shrill and plaintive than the notes of the healthy sheep, but the only one I heard utter the usual prolonged bleat with which sheep call to each other, or to their keeper, uttered it in the natural key, and this was on the sixth day of the disease.<sup>1</sup>

On the sixth day one of the sheep began to rub her breech often and hard against the fence, and she continued this more or less until death. From the appearance of the parts I inferred this was occasioned by an irritation of the vagina.

Those which exhibited the greatest decrease of aggressiveness, as their strength failed, never resumed the usual timid habits of their nature. They retreated from nothing; and to the last, if a man entered their pen and threatened them with a stick, they instantly attacked him.

#### THE LAST STAGES AND FINAL PROSTRATION OF THE SHEEP.

The prostration of strength progressed with different degrees of rapidity, owing probably to their different degrees of constitutional vigour; but all showed much and rapidly-increasing debility by the close of the sixth day. Their respiration was laboured, and sometimes irregular. The pulse of the only one counted rose to one hundred and forty a minute. One became blind in one eye, one in both, and a third partly blind in one eye. The cornea in each instance became opaque and white. But this happened only where wounds of the dogs' teeth could be found on the lids, or close to the affected eye. At this stage the scabs of nearly all of them dried up, and their wounds appeared to be rapidly healing again. When standing quiet, their heads sank down low, and they trembled slightly all over, as an animal often does after drinking cold water. Froth exuded in rather small quantities from the broad part of the mouths of three of them, and ropy saliva fell from the lips of one to the ground.

The last day or two of their lives they staggered in their gait, fell over their dead companions, and rose with difficulty. Finally, they became unable to rise. The respiration was more laboured and irregular, and in one instance stertorous. Their debility was extreme. Even at this stage, and until actually dying, they did not manifest that degree of "stupor" and "insensibility to all that is going forward," mentioned by Mr Youatt. They looked up when a loud

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<sup>1</sup> Their notes were in no case very "much altered" from the usual ones which indicate rage, pain, &c., and the "howl of the dog," said by Mr Youatt, to be "characteristic of the disease," was entirely wanting. I do not suppose, however, Mr Youatt meant to be understood literally, but merely that the key of their voices was changed, and rendered high and plaintive, as in the case of the rabid dog.

or unusual noise was made, and those that were not blind evidently took notice of objects of sight. And not one of them, to the last, showed the least indications of becoming paralytic, as the same distinguished author states that rabid sheep usually do in England. Neither the appearance of the ground nor their pastures indicated convulsions or struggling at the time of their death. I saw some of them die.

The five cases which were seen throughout, extended respectively through nine, seven, eight, ten, and six days, giving eight days as the average duration of the disease.

While the preceding statement of the symptoms of rabies accords in leading features with that given by Mr Youatt, there are even more discrepancies between them in detail, than I have called attention to. I think it probable that these differences are due in some measure to local or incidental circumstances, such as the peculiar breed, constitution, and habits of the animals, their previous keep, &c. In all these respects the American Merino differs widely from the English breeds. The season of the year, when the cases were noted, may also have had an influence. And, finally, owing to climate, or other undetected causes, the malady may not assume precisely the same form in different countries. But be all this as it may, I at least know that I carefully noticed, and instantly and, so far as I could, faithfully recorded the facts seen by my own eyes.<sup>1</sup>—*Albany Country Gentleman*.

## CARBOZOTATE OF IRON.

(From the *American Journal of the Medical Science*.)

MR H. N. DRAPER gives (*Dublin Med. Press*, Dec. 3, 1862) an interesting account of this new preparation of iron. The following are the more important points.

The mode of preparing it is as follows: Crystals of pure carbazotic acid are digested with an excess of recently precipitated sesquioxide of iron and water at a gentle heat, until the acid has disappeared. The whole is then transferred to a paper filter; and when the deep yellow solution of carbazotate has passed through, the residue on the filter is to be washed with hot water, until the filtrate becomes colourless, or nearly so. The washings being added to the original solution, the whole is evaporated to dryness at a temperature not exceeding 212°.

*Physical Characters*.—Thus prepared, carbazotate of iron presents the appearance of a reddish brown, amorphous mass, which, when reduced to powder, becomes lighter in colour. Its taste is astringent, and intensely and persistently bitter.

The chemical constitution of the salt, Mr D. thinks, is three equivalents of carbazotic acid, ( $C_{12}N_3H O_{14}$ ) united to one of sesquioxide of iron.

*Physiological Action and Therapeutic Use*.—Carbazotic acid and its salts appear to possess very decided tonic and antiperiodic properties, and will most probably prove on more extended trial valuable and economical substitutes for

<sup>1</sup> I have specially referred to Mr Youatt's statements, because his work on the sheep has ten, and probably twenty times the circulation of any other foreign work on sheep in our country, and he is justly regarded as a very high veterinary authority. His experience with rabies in domestic animals probably exceeded that of any other writer on the subject, and he is often cited with great respect by authors on that disease in the human subject. But from the manner in which he cites Mr Harris's experience and observations in regard to rabies in sheep, and his entire omission to convey any intimation, directly or by implication, that he has been an eye-witness of it, I am led to infer that he did not describe the disease from his own personal knowledge.



quinine. In large doses the acid is poisonous: according to Taylor,<sup>1</sup> ten grains have sufficed to kill a dog in less than two hours.

"In the hands of Drs Calvert and Moffat,<sup>2</sup> the carbazotate of iron has proved very successful in the cure of cephalalgia; the same authors have also employed with good effect the ammonia salt in the treatment of anæmia, intermittent fever, and hypochondriasis, and combined with opium and gallic acid in obstinate diarrhoea. They observe that while the acid itself is liable to produce cramps, its compounds with bases are free from this objection. The dose of the salts employed by these experimentalists was from .05 to .10 gramme ( $\frac{3}{4}$  to  $1\frac{1}{2}$  grain) per diem.

"More recently, Mr Alfred Aspland,<sup>3</sup> of the Ashton Royal Infirmary, has, at the request of Dr Calvert, tried carbazotic acid and its salts on a more extensive scale, and with a success which should encourage further experiment. Mr Aspland treated forty severe cases of ague, giving the acid in doses of a grain three times a-day, gradually increased to four grains at each dose. Some of the patients were relieved in forty-eight hours, while in two cases the treatment had to be continued for nine weeks. Mr Aspland has also employed the acid with good results in diabetes, in anæmia and prostration from loss of blood in infantile marasmus, in rickets, and as a tonic in cases of debility, and where quinine is usually given; also in dyspepsia and hypochondriasis. He states himself as unable to decide whether the salts of carbazotic acid or the acid itself act better, and does not allude to any inconvenience resulting from the use of either beyond the peculiar colouration of the skin always attending the continued use of this remedy.

"The iron salt will probably be found from its ready solubility one of the best forms of administering carbazotic acid, and especially suitable as a substitute for the combination of quinine with ferric salts. It should, on account of its intensely bitter taste, be administered in the form of pills.

"A most remarkable result produced by the continued exhibition of this acid and its salts is that the skin and conjunctivæ of the eyes become dyed of a deep yellow hue, and the urine acquires an orange colour. This effect is, according to Drs Calvert and Moffat, generally brought about in a time varying from two to sixteen days after the commencement of the treatment, or when about fifteen grains of the acid have been taken, and they are inclined to attribute the failure of Braconnot in producing this colouration, to the fact that he employed the potash salt, which is almost insoluble. Mr Aspland, whose experiments have been cited above, finds that the skin becomes most easily tinged in robust subjects, and more in adults than in children. The urine, on the other hand, is more coloured in these cases. The skin in the best dyed cases clears in two or three weeks after the remedy has been discontinued.

"Dose.—From half a grain to two grains, gradually increased."

### METALLIC SUTURES.

MR W. N. CHIPPERFIELD, Staff Assistant Surgeon, Madras, reports (*Madras Quarterly Journ. Med. Sci.*, July, 1862) very favourably of metallic sutures introduced into use by our ingenious countryman, Dr M. Sims. Mr C. says, "I will not go so far as to say that ulceration never does take place in the track of a metallic suture, because I have seen a few instances in which it did occur. But it may safely be affirmed that, as a very general rule, there is no irritation set up by metallic sutures, and that they may be left until the wound has entirely healed, without any ulceration occurring around them. Those who use these sutures must have had numerous opportunities of remarking the very great advantage which they possess, in this respect, over the non-metallic ones.

<sup>1</sup> *On Poisons*, p. 793.

<sup>2</sup> *Pharm. Journ.*, vol. xvi. p. 167.

<sup>3</sup> *Med. Times and Gazette*, vol. ii. 1862, p. 289.



"A curious instance occurred in my practice. I used iron wire sutures to close a wound after removal of a tumour from the back. When union was complete I directed the sutures to be removed, and the person to whom the removal was intrusted overlooked one of them. Three months afterwards the patient presented himself to show that he was quite cured, but just as he was leaving the room he remarked, 'sometimes my skin feels irritable, and then, when I rub my back, I feel a sharp point like that of a pin where the wound was.' Drawing my finger along the cicatrix I detected this sharp point and found that it was one extremity of a suture which had not been removed, the rest having, probably, become imbedded in the few granulations which sprung up at some points before union was complete. I drew upon the wire so as to expose the twist, divided and removed the suture; and ascertained that, although it had been there for three months, no irritation, ulceration or suppuration had resulted from its presence.

"When we remember how many surgeons must have had opportunity of noticing the very little irritation, if any, that attends the circuitous course which needles take when they have been accidentally introduced into the body, we can but feel surprise that metallic sutures did not long ago come into surgical use."

#### UTILITY AND SUPERIORITY OF METALLIC SUTURES.

M. OLLIER, Surgeon to the Hôtel-Dieu, Lyons, terminates a series of papers with the following conclusions: 1. Metallic sutures are less irritating than those of vegetable or animal origin; they divide the tissues less rapidly, are sooner and longer tolerated, occasion less suppuration in their track, and leave less apparent cicatrices. 2. It is not only on the results of a great number of operations in which we have employed these ligatures that we base our statement of their superiority, but also upon comparative experiments rendered as rigorously exact as possible; the advantages possessed by the metallic sutures of the same size over the organic become still more striking when the very delicate metallic threads, which we call capillary, are employed. 3. The more delicate the thread is, the less it irritates and divides the tissues, this division being the result of ulceration, and not a mechanical action; in order that this advantage be realized, the flaps must not be submitted to too violent traction, for pressure being then exerted on an excessively narrow line, the thread acts in some sense as a cutting instrument: to prevent this inconvenience, the number of sutures must be multiplied, in order to distribute the resistance over a great number of points. 4. The superiority of the metallic threads consists in the following circumstances: (1), their delicacy, for we may give them the fineness of a hair, and yet preserve sufficient resistance; (2), the constancy of their volume, while organic threads notably increase in this through imbibition of the discharges; (3), the polish of their surfaces and their impenetrability by putrifiable fluids; and (4), the fixity with which they maintain the edges of the wound in contact, while the organic sutures become relaxed and float in their track when ulceration has commenced. 5. Of the various metals from which sutures may be made, iron is the most suitable, by reason of its greater tenacity and the facility with which it may be procured; by covering it with an unoxidizable metal, all the advantages are conferred on iron which appertain to other metals, which it might seem desirable to substitute for it by reason of their resistance to the reaction of organic liquids. 6. For autoplasmic operations, iron threads of a greater fineness than have hitherto been employed are very suitable; of the delicacy of a hair, they still possess sufficient resistance to allow of their being manipulated with safety and convenience, while so slight is the irritation which they give rise to (being, so to say, forgotten by the tissues), that they are often tolerated without giving rise to suppuration; they may be multiplied without inconvenience, and they may generally be employed without covering them with gold or tin; when they are intended to remain long within the tissues the iron should be galvanized, but in no case has their



oxidation hitherto given rise to any serious inconvenience. 7. Metallic should, then, replace organic threads in all kinds of sutures; when they are fine, they are very easily passed through the tissues, and can be fixed by a greater number of procedures than the organic threads; their removal from amidst the tissues in deep-seated regions (as the vagina, velum of the palate, &c.), is the sole difficulty contingent on their employment, but this inconvenience cannot be considered as counterbalancing their advantages; the capillary threads are the only ones which are supple enough to admit of being easily removed. 8. It is a useful practice to use sutures of different sizes for different parts of the same wound; capillary threads are of great utility as "perfectioning sutures" in autoplasty, when it is our object to attain a perfectly exact union; for some operations large threads are required, as "sustaining sutures," to bring and keep together the base of the flaps, the edges of which are maintained in contact by capillary threads. 9. Metallic sutures may be left longer within the tissues, and they thus become a precious resource in wounds which, uniting slowly, require that their edges should be kept a long time in contact. 10. They may be advantageously employed as setons in small abscesses of the neck and face, when we wish to avoid producing visible cicatrices. We may also make use of them for the ligature of blood-vessels, and they are especially adapted for the operation for varicocele, allowing of the gradual division of the venous agglomeration by a very simple procedure.—*Brit. and For. Med.-Chir. Review*, Oct. 1862, from *Gaz. Hebdom.*, Nos. 9, 12, 17, 23.

OAKUM AS A SUBSTITUTE FOR LINT IN GUNSHOT AND OTHER SUPPURATING WOUNDS.

In our previous No. (pp. 566, 67) we noticed the commendatory remarks of Dr Sayre on the use of oakum as a substitute for lint, and the grounds for this preference. Our experienced friend, Dr W. S. W. RUSCHENBERGER, dissents from the conclusions of Dr S., and, in a recent No. (Oct. 9, 1862) of the *Boston Med. and Surg. Journal*, he gives some good reasons for his dissent.

"In order," he says, "to obtain an idea of the comparative absorbent power or capillary force of oakum, cotton, lint, and tow, small parcels of these articles, of ascertained weight and dimensions, were gently placed on the surface of water in a basin, and carefully weighed again after removal. The weight of water absorbed by each, thus ascertained, is stated in the following table:—

	Weight.	Dimensions.	Time in contact with water.	Weight of water absorbed.
Cotton (wool) . .	40 grs.	3 in. diam.	1 hour 10 min.	8 grs. = 1-5
Oakum . . . . .	"	2½ " "	" "	10 " $\frac{1}{5}$
Tow (from hemp) .	"	2½ " "	" "	250 " = 6.25 times
Coarse lint (shoddy)	"	2½ " "	1 minute	280 " = 7 "
Scraped lint . . .	"	2½ " "	Instantly	298 " = 7.45 "
Patent lint . . .	"	1¾ by 3 in.	4 minutes	299 " = 7.47 "

"Forty grains of cotton submerged and slightly squeezed under water for a few seconds, was found to retain, without dripping, 270 grains; and an equal weight of oakum treated in the same manner, only 94 grains of water. The oakum retained little more than twice its weight, and the cotton nearly seven times its weight of water.

"The inference from these experiments is that the capillary force of patent lint is nearly thirty times, and that of tow twenty-five times, greater than oakum; and the capillary force of oakum is only one-fifth greater than that of cotton. Oakum absorbed one-fourth, and cotton one-fifth, of its weight; but tow, 6.25 times, coarse lint 7 times, scraped lint 7.45 times, and patent lint 7.47 times, its weight of water.

"If the property of capillarity alone is to determine the choice of tissue or substance for covering suppurating wounds, any description of lint or tow is to be preferred to oakum.

"Tow has been long employed as an outside dressing or recipient of profuse discharges; and also as a swab in cleansing offensive suppurating wounds, where sponge was not sufficiently abundant to be expended in this way. The objection to tow is, that there are apt to be sharp or hard spiculæ adhering amongst its fibres, which give pain when brought against a sensitive surface; but this objection may be obviated by carefully selecting and carding the substance. A better substitute for sponge for cleansing purposes in surgery is cotton wool, which, saturated with soapsuds, or simply with tepid water, and held in a dressing forceps, forms an admirably soft application that may be used where the finest sponge would be found by the patient rough and harsh. Indeed, considerations of cleanliness and of avoiding the diffusion of morbid matters from patient to patient, suggest that sponge used once as a detergent implement should not be used in the case of any other individual, and not too often on the same person. Cotton or tow forms a detergent implement so cheap that it may be renewed at every dressing, and ought to be substituted for sponge, without any reference to cost, for cleansing purposes.

"It is said that cotton or lint placed over a suppurating wound serves to *prevent* the escape of pus, and that oakum should be substituted. But it seems that oakum as well as lint may block the way and hinder the flow of the escaping liquids if not removed when saturated. Then why should a copiously discharging wound be enveloped in any capillary material? Why not permit the discharge to flow without impediment of any kind? Any contrivance which would keep the wounded part at a normal temperature, whether in the form of oiled silk, or other tissue not readily permeated by moisture, or in shape of a simple veil or shield, from flies in hot weather, might prove more salutary than the effects of a bunch or pledget of wiry oakum secured over it by bandage or otherwise.

"Supposing that oakum possesses all the qualities claimed for it in the instances specified, it cannot be regarded as a substitute for patent lint, because there is often necessity for just such a pliant tissue to serve as the vehicle in the application of ointments to morbid surfaces—such as blisters, for example.

"Substitutes are almost always defective expedients. Whether they are adopted from parsimony, poverty, or other reason, they rarely satisfy the requirements they are employed to meet. The workman, who uses implements in all respects adapted to his vocation produces more perfect results than he who labours with a paucity of tools, and hence, driven to expedients, is compelled to require from his awl the work of a gimlet.

"Oakum is, doubtless, applicable as a substitute to some ends. It may answer as an external dressing, a mere recipient of liquid discharges; but for such purposes, as it costs much more and has less capillarity, it is a poor substitute for tow. Its application to the uses to which patent lint is especially adapted could be suggested only where no soft tissue is procurable. Canton flannel would answer the place of patent lint better than oakum; but, comparing their adaptability to the object in view, the propriety of substituting Canton flannel, at thirty-five cents the square yard, for patent lint, while this is procurable at forty cents, does not commend itself to notice."



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### ORIGINAL COMMUNICATIONS AND CASES.

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*The Health of Stock in the United Kingdom during the year 1862.*

By JOHN GAMGEE, Principal of the New Veterinary College, Edinburgh.

FACTS supplied by 250 veterinarians distributed over the British Isles, enable us to draw general conclusions as to the extent to which live stock suffered from disease during the past year. The special worth of these facts is owing to the impartial testimony of men daily engaged in watching the progress of disease in their respective districts and counties; and though numerical exactness, indicating the mortality, cannot be looked for until a proper system of collecting statistics is adopted, we can come to general conclusions of great value and engrossing interest, by weighing the evidence before us so far as it goes.

Much more information has been gleaned concerning epizootic and contagious affections than with reference to sporadic maladies, accidents, &c. The reasons for this are obvious. Individual cases of disease may present remarkable features, which attract attention at the time, but the interest awakened by plagues which decimate cannot fail to ensure special attention. It is remarkable, that during the last twenty years, during which epizootics have raged with great virulence and without interruption, there should have been only occasional outcries, loud enough at times, but invariably languishing in a few weeks. There has been no organized and constant effort to counteract epizootics, which we owe to our foreign trade, and the excitement which led to legislation in 1848, soon lulled to such an extent, that diseased herds and flocks are as readily exposed for sale in open fairs and markets or slaughtered as human food, as prior to the passing of an act for the prevention of contagious diseases amongst sheep, cattle, &c. The year 1862 is a memorable one for the excitement attending the outbreak of small-pox in sheep. The

disease was raging in the downs of Wiltshire, and principally on one farm, but the effect on the mutton trade was such as to reduce the price of sheep throughout the United Kingdom. In a couple of months all was quiet again, and however threatening the outbreak of variola ovina was, the damage it inflicted did not amount to an appreciable infinitesimal quantity, as contrasted with the wholesale slaughter and destruction by pleuro-pneumonia.

#### PLEURO-PNEUMONIA AND THE FOOT-AND-MOUTH DISEASE.

Concerning the last-named affections, there is a marked unanimity of opinion as to the causes in operation which induce them. All admit the evils arising from the exposure of diseased animals in our live stock markets, and trace to the constant traffic in such animals the disasters which so greatly tend to diminish the supply of animal food for the people. The reports now before our readers, and personal observations of my own, prove that the foot-and-mouth disease is imported very constantly from abroad, and spreads rapidly over the country. It has a tendency to wear out speedily, but fresh accessions of morbid matter from the Continent, by the arrival of infected cargoes in our ports, lead to the speedy recurrence of outbreaks. There are breeding districts which have escaped the scourge, but as usual it has penetrated more readily and rapidly than pleuro-pneumonia in districts that are usually free from contagious disorders.

There are several important points concerning the foot-and-mouth disease which merit special notice in a report such as the present. In the first place, the disease has attacked animals of all kinds, especially cattle, sheep, and pigs. Horses have suffered in a few instances, owing to the circumstances favouring the communication of the disease to them from cattle. Many cases have been recorded as occurring in man; and it has been recognised that children suffer very severely, and, like young suckling animals in general, are in danger of their lives when fed on the warm milk drawn fresh from an affected cow. Adults do not escape, and there have been many instances of aphthous eruptions in the mouth and throat, and also over the extremities, such as observers have long since described. The second point requiring special mention is the prejudicial influence exerted by the foot-and-mouth disease on the condition of sheep. There are many districts in the United Kingdom over which the malady was propagated when the tups were placed amongst the ewes. In fact, like all contagious disorders, the foot-and-mouth disease spreads more particularly when circumstances favour the movement of animals, and the farmers who purchase or hire tups are apt thus to contaminate their flocks. With every market place, fair, or railway truck, more or less impregnated with the virus of epizootic aphtha, it is not to be wondered at, if, in 1862, many flocks of ewes suffered at tupping time, and in too many instances the results have been barrenness, abortion, and a small crop of lambs. But our flocks have suffered to



a very great extent from lameness, the result of inflammation of the feet, and a great variety of lesions, which have been most severe on lowlands, undrained pastures, and especially on grounds usually much subject to foot-rot. Lastly, it is proper to notice, that dairymen have sustained heavy losses, especially in large towns, from cows running dry, or suffering from inflammation of the udder. The cases of mammitis, resulting in permanent induration, have been very numerous, and commented on by the veterinary surgeons who have favoured me with reports.

Concerning the lung disease in cattle, I have only to say, that the mortality arising from it perhaps exceeded, in 1862, that of each year since 1856. It was unusually prevalent in districts commonly free from it, and a very common cause of this was the increase in grazing and stall feeding, where in former years stock was exclusively bred. As usual great complaints have been made concerning Irish stock; and I have striven to impress on the minds of the farmers in the three kingdoms, the fact that the Irish cattle are naturally not more subject to the disease than other animals, and that it is owing to the distances they travel, the many fairs they are in, the number of times they change hands, that lead to their falling victims to contagious disorders which they cannot escape. All who travel in Ireland, and investigate this subject, will learn that the Irish dread Scotch cattle, Ayrshire cows and English calves, as the generators of pleuro-pneumonia amongst them; and it is obvious that British cattle in Ireland have had to pass through a similar ordeal to the Irish stock in Britain. I wish it to be very distinctly understood, that were proper precautions adopted to stop the trade in diseased animals, we should soon cease to hear of the lung disease in the British Isles. How important this is may be inferred from the fact that, according to estimates, which I believe to be extremely moderate, and which I have prepared for Government, the loss by pleuro-pneumonia alone amounts to nearly two millions sterling per annum, and the value of the cattle lost by this disease cannot be less than three times the value of the cattle imported. For further information on the causes of pleuro-pneumonia and its ravages in various parts of the United Kingdom, I must refer the reader to my Report about to be presented to the Houses of Parliament.

Having been actively engaged in controlling the progress of small-pox in sheep, I may be required to enter at length into the observations made by me concerning this disease at home and abroad.

#### SMALL-POX IN SHEEP ; ITS HISTORY AND CAUSES.

Small-pox in sheep spreads both through contagion and infection. Observers are agreed that it is not safe for a healthy flock to come to within 500 yards of a diseased one. A fixed virus is deposited in stables, on pastures, roads, railway trucks, &c., by diseased sheep, and many agents may thus act in favouring an indirect contact. Human beings carry the disease for miles, and shepherds have often

communicated the malady to distant flocks. It is said that hares and rabbits are subject to the disorder, and may be the carriers of the contagion. Sheep dogs certainly can be the means of transmitting the virus. The malady has been observed on them, and a marked case occurred in Wiltshire. Mr Charles Percivall had an opportunity of observing the disease on Mr Stephen Neate's dog, and informs me that the symptoms were identical with those of variola ovina, and there could be no doubt that the dog contracted the disorder from the diseased sheep. The disease has been communicated by inoculation to man and cattle.

When small-pox enters a flock, it may be checked and limited to a few cases, or it may affect the whole. I have observed that the disease is far more severe in countries where it is the practice to house the sheep. Few escape, and the majority die. It is this that renders all the German veterinarians such decided partizans of the practice of inoculation. They find that sometimes not one per cent. die where flocks are inoculated, whereas 50, 60, 80, and upwards of 90 per cent. are destroyed by the natural disease.

In proportion to the close, hot, and ill-ventilated condition of stables in which sheep are congregated, is the mortality heavy. The malady spreads far more certainly and rapidly amongst the continental flocks than our own. Here the course of the disease usually consists in the attack of one or two animals which probably survive, but not being separated from the flock, contaminate dozens. In the course of about a month several score of sheep are affected, and in two, three, or four months, every member of a flock of one or two thousand sheep may have been seized. Where a flock of sheep is housed, the disease is propagated to every animal in as many weeks as it takes months on our hills. Many vigorous animals in a flock prove rather refractory to the influence of the virus, and some may escape altogether. This is not seen where causes combine to weaken the system and favour the repeated approach of contagious matter.

In France the mortality observed amongst flocks affected with this disease varies from 20 to 40 per cent. In England it has attained 50 per cent.

Every writer of merit in Europe attributes this disease to the introduction of diseased animals across the Russian frontier into Poland, Hungary, Prussia, Pomerania, &c. This malady, like pleuro-pneumonia in cattle, epizootic aphtha, and contagious typhus, spreads *invariably* from east to west. It is a malady which never has, and never will, originate spontaneously in this country.

It is perpetuated in some countries, such as Prussia, and especially in its eastern divisions, by the practice of the yearly inoculation of lambs born on farms frequently visited by the disorder.

Mr Meyer, writing in 1848, said, with regard to inoculation for small-pox in sheep, "I should myself question its policy, as it tends to perpetuate a disease in the country which, by sanitary regulations on the part of the Government, and the active co-operation of local



authorities and agriculturists, might be arrested in its course and thus die out." I shall consider the subject of inoculation further on, but cannot refrain from quoting Mr Meyer's words, which are pregnant with truth. Europe has lost hundreds of thousands of sheep, and has suffered from repeated outbreaks, entirely from the absurd practice of inoculation. It is the most active cause tending to propagate the disorder with rapidity over the greater part of the continent of Europe. Thus, if a flock of infected sheep communicates the disease to one or two districts in Mecklenburgh, the appearance of the disorder is notified to the magistrate, and the districts are proscribed. This is the signal of alarm which leads forthwith to the inoculation of flocks in a number of districts, and for miles around the seat of the first outbreak. The result may readily be conceived; a whole country is at once affected. The inoculated flocks are soon pronounced "through the disease" "*durchgeseucht*;" and as animals are freely sold from them, we find disease spreading through the convalescent or healthy sheep. It is impossible to say how soon after inoculation or a natural attack a sheep loses the power of communicating the disease. Wool retains scabs and virus in great quantity, and inoculated sheep that have apparently recovered, have frequently led to outbreaks of the disorder.

Heusinger says, with justice, that the epizootics of sheep are rarely well noted by authors, and a history cannot be given of them. I do not intend to trace all the outbreaks concerning which partial information has been obtained. Since the first reliable accounts of this disease in 1567 by Laurent Joubert, there have been a series of more or less general spreads of this disease over the continent of Europe. It is not unlikely, from references by old authors, that on some rare occasions the disease was imported into the British Isles, but there are no satisfactory records of such events; and Hogg, writing in 1807, having given an account of the sheep pox, as described by a French veterinarian, Vitel, observes "that sundry of the diseases here treated of are analagous to those in our own country, consequently the cures inust also be of use here, and though others of them have not yet appeared in Britain, the introduction of foreign breeds may introduce foreign diseases. This we can neither guard too well against, nor be too well prepared for when it happens."

Our veterinary surgeons had never seen the disease, except abroad, until 1847. That our insular position protected us formerly there is no doubt, as every 10 or 15 years the flocks of eastern Europe have suffered severely, and since the beginning of the present century there are yearly outbreaks in one country or another. All the information I have been able to obtain, indicates that Russia and the countries bordering on it suffer most. Greece has been a very constant sufferer, as well as Austria. More rarely has the disease devastated the flocks of the northern German states, as well as Hanover and Saxony. Holland and Belgium have been occasionally the seats of the disease, and France has suffered more than either, owing to its more exten-

sive importations. For many years past the malady has been stationary in Prussia, attacking many districts yearly from the introduction of diseased sheep, or the practice of yearly inoculations. The disease has travelled thence through Pomerania to Mecklenburgh, and through Hanover to Holland, and Britain has received infected flocks of sheep from Hamburgh, Toningen, and Rotterdam,—far more frequently, I believe, from Hamburgh than from any other part.

It is somewhat remarkable that our flocks should have escaped attacks of small-pox during the first five years which succeeded our importations; but my inquiries in London amongst very well informed dealers, butchers, and others, are satisfactory. The sheep imported were at that time very inferior. They were not, like the cattle which communicated pleuro-pneumonia, bought up for store purposes, but sold at once and slaughtered. The London market was then not so common a resort as at present for farmers who purchase sheep to feed for a few months, and at most some butchers might have kept a few over from one week to another, or a little longer. Some of these kept sheep often died, so much so that those who bought them did not repeat the experiment, and lean small sheep were dressed up *as lamb*, and sold in the east end of London amongst the poor. Whilst lamb was at a high price in the west end, it was at 4d. or 6d. a pound where the lean, small, and pallid foreign sheep were sold as such.

But a very satisfactory explanation of the alarming introduction of small-pox in 1847 is to be found in the extraordinarily sudden increase in the importation of sheep. In 1847, 139,371 sheep were imported, whereas the total amount for the five years previously was 111,222. The number was as low as 210 in 1843, under 2000 so late as 1844, under 16,000 in 1845, and 91,732 in 1846. The foreign dealers were exerting themselves to increase the supply of sheep, and it is not at all to be wondered at that small-pox spread westward. It must not be forgotten that the countries with which we immediately trade were as healthy as our own in the early days of our importations, and it was only when they had to import for our supplies that they suffered and injured us.

It was only then, as the foreign stock improved in character and increased in quantity, that small-pox attacked our flocks. There may have been partial outbreaks, as there have been frequently since 1847, but being confined to a few sheep, and fortunately not spreading, we have heard no more of them.

The outbreak of small-pox in 1847 continued until 1850, and it interfered with the foreign trade. It was as late as 1850 that the importation of sheep again attained the number of 1847; indeed, it exceeded that number by nearly 4000 sheep, and there was a rapid increase in our importations up to 1852. They then attained 217,649, and although individual outbreaks of small-pox had occurred since 1849, especially amongst the stocks of butchers, it was in this year of extraordinary increase in the foreign trade that we began to suffer more severely. More severely still in 1853, and then, thanks



to the general practice of slaughtering foreign sheep in or near London, we escaped until 1862. I am assured that during the last three or four years cases of small-pox have been seen by salesmen and butchers who have kept foreign sheep over from week to week. I have also been informed that there have been more foreign sheep, or British sheep that had been mixed with foreign ones in the London market, sold this year to be fed inland, than for many years previously, and that a number of partial outbreaks have come to the knowledge of those whose trade would be destroyed if they did not keep the secret, and who, knowing the dreadful nature of the disease, destroy the infected animals at once. One man purchased a lot of foreign sheep at 30s., and in one week was glad to dispose of them at one-third that sum.

Merino sheep imported from Tønning, but most probably reared in Mecklenburgh, were the first to communicate the disease to British stock. Spanish sheep have been reported as frequently attacked with the disease, and the outbreaks in Spain and Portugal are undoubtedly due to communication with Africa across the narrow straits of Gibraltar. But merino sheep are largely fed and reared in those parts of Europe where I have already said the malady rages constantly. It is not to be wondered at then if they communicated the disease to us. Fifty-six of these sheep purchased on the 26th July 1847 led to an outbreak at Datchett, near Windsor. They were imported from Tønning, on the coast of Denmark. Another lot of 166 were brought into the port of London from Hamburgh by the "Mountaineer," and one of 80 by the "Princess Royal." A part of a large cargo was purchased on the 26th of July of two salesmen by Mr B. Weal of Woodhall, Pinner. "These lots," says Mr Simonds, "were equally divided between himself and his brother, and in both of them the disease has shown itself." A portion of the same cargo of sheep by the "Princess Royal" was sold to Mr Goodchild of Kingsbury, and they are reputed to have been also affected with it.

In 1847, 1848, 1849, and 1850 the disease committed great ravages not only in Middlesex and Surrey, but particularly in Norfolk, Cambridgeshire, Suffolk, and Hampshire.

Since that period, though no information has been obtained of local outbreaks, it is known to practical men that these have not been few.

When we know that the very large majority of outbreaks of pleuropneumonia are concealed, it is natural to infer that the same has happened with outbreaks of small-pox, especially amongst the class of persons who deal in foreign stock, and who know the malady perfectly well.

Abroad I have found that outbreaks are also very generally ignored. The most complete collection of records referring to this, as to the epizootics, is to be derived from the "*Mittheilungen aus der thierärztlichen Praxis im Preussischen staate*," published June 1854 in Berlin.

In 1858 Professor Gerlach stated that statistics indicated the greatest prevalence of the sheep-pox in the principal provinces of Prussia,



Posen, Pomerania, and Brandenburg; in Silesia and Saxony only isolated outbreaks occur, whereas the western provinces have remained free. It is thus evident that the disease is stationary in certain provinces, and the question is, must it be regarded as an enzootic disorder due to local influences, or is the cause of its persistence in these parts the preservation and reproduction of the small-pox virus by means of yearly inoculations as a precautionary measure on the part of many flockmasters? Some inoculate and others do not, the *contagium* is, therefore, preserved or regenerated at several or many points. Under these circumstances it is scarcely possible, adds Gerlach, to avoid the spread of the disease from the inoculated herds, and this happens with great certainty and frequency in consequence of the absence of all sanitary regulations with regard to the inoculated flocks. Several farms exist in each circle where small-pox appears annually. After soliciting aid from his different reporters in order to collect facts on this subject, Gerlach says that in the Regierungs-Bezierk, Potsdam, in which he had occasion to investigate the outbreaks of the disease, they were always due to contagion. Often they depended on the sheep coming in contact with inoculated flocks, and at other times on sheep imported from Pomerania.

It is therefore evident that the practice of inoculating lambs may be beneficial to farmers in danger of suffering from small-pox amongst their sheep, but these inoculations should be practised on all the animals in a district at once or not at all. This, I need scarcely say, would be as absurd as it would be expensive and difficult. Prussia suffers more from partial yearly inoculation than from the natural outbreaks due to the importation of foreign stock.

I have frequently referred to small-pox in Pomerania. My inquiries when in Germany resulted in the confirmation of all I had previously heard and read as to small-pox in that part of the Prussian dominions. I learnt, however, that in 1861 the disease was worse than it has been for many years, and as usual the alarm of small-pox outbreaks led to many farmers inoculating their flocks, and establishing many centres whence the disease could extend itself.

The year 1862 has been one of extraordinary losses by contagious disorders. From Pomerania the foot-and-mouth disease entered Mecklenburgh in January, and pleuro-pneumonia also appeared in the Grand Duchy. The government is, however, very active in tracing the infected herds, and the outbreaks of these diseases were comparatively limited, though continuing more or less throughout the year.

Small-pox in sheep then broke out. It appeared in April at Hinter Ribnitz, and thence it spread to many farms in the neighbourhood of Rostock. The attention of the Mecklenburgh Government was directed to the subject in the month of June. District after district was rapidly proscribed, and many farmers, alarmed at the approach of disease, inoculated their flocks. The extent and distribution of the malady is shown in a map of Mecklenburgh.

My inquiries in Mecklenburgh led me to believe that districts were



proscribed long after small-pox had been in them. Though the Government regulations are stringent, there are no means employed to ensure that they are enforced. It will be observed that it was officially announced that small-pox was at Quassel only as late as the 6th of September, whereas by that time the disease had committed great ravages, and had in reality been in a flock four months. Many other cases of a similar nature occurred.

I also found that infected sheep and the skins of animals that had died of the disease were sold.

The first farm I visited on my way from Hamburg to Rostock was Quassel, near Pritzier, towards the south-west of Mecklenburgh Schwerin. The proprietor farms his own land. He is a wealthy man, possessing also an estate on which he has sheep and cattle beyond Lübeck. At Quassel he had in the month of May last 250 sheep. As none are bred on this estate, and only purchased to fatten for the butcher, 400 sheep were bought about the middle of May. The 250 fat ones were then sold, but not removed by the dealer. Both purchase and sale were effected by the proprietor, Herr von Paepke, with a Mr Reuter, a large dealer in Hagenow. Herr von Paepke could not at the time learn, because Herr Reuter chose to conceal, whence the 400 sheep came, but afterwards was informed that they came from an infected district in the neighbourhood of Gustrow. Very shortly after purchase, disease appeared in the new flock, and spread so rapidly that in July it was thought expedient to clear out the fat ones, which were sent to *Hamburg for the English trade*. On this point my inquiries have been most particular, and I state the facts as gleaned from Herr von Paepke himself, his land steward, and shepherd. In August all the sheep were inoculated, and with apparent effect. I examined the seat of the inoculation, the ears, in many, and the appearances indicated that the inoculation had taken effect. Many severe cases resulted from the inoculation, and some apparently natural cases occurred, and within the last three weeks a very severe outbreak has been witnessed in which many of the sheep have a well-developed eruption, and others are seized chiefly in the head, and are suffering to a great extent from partial paralysis of the hind quarters.

The loss on these 400 sheep has attained the heavy number of 145, and several others are sure to succumb.

Not only, however, has Herr von Paepke sold sheep since the disease broke out on his farm, but I noticed in a shed a large number of skins. I was told that these were the 145 skins of the dead sheep, and that such was the fact their appearance amply betokened. It was considered a great pity to bury the sheep with their skins, and the law has been evaded as it is daily in Mecklenburgh.

Small-pox was also raging at Heidhof and Felklas, and after inquiries in the south-western district I proceeded to Schwerin. There I found the district clear; some farmers had inoculated, but not in the vicinity of the town.

My visit afterwards to Rostock afforded me an opportunity of spending some time with a gentleman who has been very active during this outbreak, and who did much in 1843, 1844, 1848, &c., when small-pox also existed in Mecklenburgh. This gentleman, Dr Cohen, is professor of veterinary science in connexion with the Agricultural College.

In his company I proceeded to the extreme north of the duchy in the Doberan district, where the disease is raging very severely. On the farm of Hinter Bollhagen, tenanted by an extremely intelligent gentleman, Herr Domainpächter Zander, I witnessed a very singular outbreak.

In the month of July last, Herr Zander had a home-bred stock of 900 sheep. None were bought, but the district is an open one, and many flocks, as in Wiltshire, travel backwards and forwards. On the 12th of August, a natural case of small-pox occurred; a veterinary surgeon was called in, who, in accordance with the laws for the prevention of this disease, inoculated the whole flock on the 15th. Herr Schroeder, of Kreplin, the veterinary surgeon, has the reputation of being very skilful, and he inoculated all the sheep with perfectly fresh lymph, in the tail. A benignant eruption resulted, and in about five weeks the whole flock was pronounced through the disease, and on the 26th of September, it was officially announced that the farm was clear of the disease.

This state of matters did not last long. On the 7th of October a fresh outbreak took place, and in 8 days 32 severe cases of apparently natural small-pox occurred. I saw these sheep, with the exception of eight already dead and buried, but eight more fresh cases developed within the last fortnight. One sheep in a dying state was killed, and I performed a post-mortem examination. Other eight or ten sheep were also in a very critical condition, and in my opinion could not live.

I made careful inquiries as to the origin of the two outbreaks on this farm. The first was attributed to the sheep of a neighbouring farmer, who passed to their pastures within 200 yards from Mr Zander's farm. The flock alluded to was seized about a month prior to the disease appearing at Hinter Bollhagen.

The second outbreak appears very distinctly traceable to the introduction of a ram bought from Herr Busch, in Toitenwinkel, whose sheep had all been voluntarily inoculated without the previous manifestation of disease in a natural form. The ram seemed to have passed through the disease.

I examined carefully Mr Zander's flock, with a view to determine whether they had been efficiently inoculated, and I could find in all the traces of a previous local eruption. There had been no sloughing, and I particularly notice this, as it is justly stated, that when inoculation is followed by such a result, the preservative influence is not observed.

My inquiries on a number of farms and from many persons indi-



cate that at least on three-fourths of the farms in Mecklenburgh where the disease exists, it has been simply induced there by inoculation.

When on the Continent, I obtained useful information as to the outbreak of small-pox in Hanover, Holland, and Belgium.

In Hanover I had the great advantage of meeting on several occasions with Professor Gerlach, Director of the Royal Veterinary College. Professor Gerlach, though a strong advocate for inoculation as a means of mitigating the losses by the sheep-pox when the disease has appeared in a flock, assures me that the Continent of Europe suffers severely in consequence of the yearly inoculations in non-infected districts and non-infected flocks. Professor Gerlach had occasion to demonstrate this in the case of three duchies in Anhalt, viz.: Bernberg, Köten, and Dessau. Severe losses were annually sustained in these duchies until Professor Gerlach caused the yearly inoculations to be stopped. For several years past they have been quite free from the disease.

It is owing to the practice which Gerlach properly condemns that Pomerania and Brunswick always suffer from sheep-pox, and from these countries it passes into Hanover. In 1861 the losses by the disease were very severe in Saxony, but more especially in Magdeburg and Halberstadt. This year (1862) it has continued to spread as usual from east to west, and has broken out in many parts of Hanover, such as in the districts of Nienburgh, Neustadt, Wunstorf, Liette, Mecklenhorst (very severe), Blumenhan, Pozzenhagen, and Wunstorf. When I left Hanover on the 27th of October, Professor Gerlach told me that the disease was spreading fast, and that he had been requested to address the farmers on the 5th of November, as to the precautionary measures to be adopted to check the further spread of the disease.

When in Hanover I visited several farms for the purposes of this inquiry. I ascertained that much disease had been due to the travelling of diseased sheep across the country from east to west, and towards Holland. Dealers had purchased diseased sheep, and no less than 200 animals were sold from one infected flock at Erstorf early in the summer. They were fat, and it was thought best to sell them before they took the disease. The losses were severe on this farm.

The chief outbreaks in Hanover first occurred about the months of March and April.

That small-pox has been very prevalent on the continent during the last two or three years is also proved by an outbreak in Belgium. It is rare to observe the disease in that country, more rare than I had been led to understand before visiting it. It is stated that no outbreak had occurred since 1823 and 1825 until 1860. Three hundred sheep from Germany, purchased in the latter year by a farmer at Petit Boeulx lez Nivelles, and mixed with 700 or 800 more sheep, soon manifested signs of the disease. Eight per cent. were lost before a competent veterinarian was consulted. Separation and inoculation

were resorted to, and owing to great precautions taken the disease was limited to the one flock.

I particularly notice this outbreak in Belgium, as it shows how German sheep travel far westward, crossing Hanover into Holland, as well as through Holstein from Mecklenburgh, for the English markets.

Holland has suffered severely for the last four years. Its sheep-rearing province is Drenthe, famed for its sandy plains, heather, buckwheat, and flocks of sheep. In no other Dutch province are the flocks so large or so numerous. Herr Moss, veterinary surgeon at Assen, has witnessed outbreaks annually since 1858. He has inoculated many flocks, and the losses have occasionally been very numerous. The districts most injured by it this year have been Roldè Gieton, Borger, Buiven, Peize, where it has been for two years, Kolonie and Veenhuizen. In the two latter places it was raging severely when I was in Holland. Last year the disease appeared in Friesland, but there are no flocks of sheep there of any importance, and it has not committed great ravages in consequence. Some outbreaks have been witnessed in Gröningen, but none in North and South Holland, or Zealand, so far as I could learn.

That diseased sheep were, however, exported from Rotterdam early in the current year for England, I had ample opportunity of learning in the province of Utrecht. The farmers in this province have flocks varying in number from 100 to 200 sheep. The country is open, and I met many sheep crossing fields and travelling on the road. As in Wiltshire, the drovers prefer crossing country to the high roads, and every outbreak that I could trace was attributed to contact of flocks with the diseased sheep driven through the province. I observed the malady at Den Oond and in two farms at Schalwijk. When the malady was raging at Den Oond in the month of August, twenty-six sheep, apparently in health, were sold to passing dealers for the English trade. The twenty-six sheep were the only ones of a flock of about 120 that had not taken the disease at the time of their sale. They were, of course, infected sheep. Before I left Utrecht on the 28th of October, I learned that the disease had spread to Gooij, and other farms near Holstein.

It is particularly worthy of notice that the diseased sheep which traversed the province of Utrecht must have been shipped at Rotterdam about the months of April and May. Both in Hanover and Holland, as in Wiltshire, the first cases were observed at shearing time, but of course the diseased sheep that had communicated the disorder had passed through the various countries some time before the sheep were shorn. So far as I could learn the outbreak was a week or two earlier near Nienburgh in Hanover than at Den Oond in the province of Utrecht.

I am now led to consider the outbreak of small-pox in Wiltshire.

The history of that outbreak is a most instructive one, as it affords a striking illustration of the serious losses sustained by a disease of so



contagious a nature from not having been recognised on its first appearance; it also affords us the most conclusive evidence with reference to the best means for the prevention of such a disease in future, and the safest measures to adopt for the mitigation of losses when it happens unfortunately to appear among our flocks.

Mr Joseph Parry, of Allington, owned at the commencement of this year, 1862, one of the choicest flocks in Wiltshire. It was exclusively home-bred, and consisted of 992 ewes, 9 rams, and 710 lambs. Such a flock in the centre of the North Wiltshire downs might justly be regarded as not likely to suffer first from any contagious disorder.

But the district turns out to be one not unfrequently visited by contagious disorders, and my attention has been specially directed to the peculiarities of that portion of country which render it liable to invasions of scab, and the foot-and-mouth disease, as well as the sheep pox.

The farm of Allington, about six miles north-east of Devizes, stretches over St Anne's Hill, or Tanhill, which is the centre of an extensive sheep district. It is also the locality in which there is an extensive sheep fair, held annually on the 6th of August. Skirting this hill, and through the heart of the district about to be described, is the celebrated "Wan's, or Devil's dyke," one of the divisions of the old Saxon heptarchy, and now levelled in some parts, but prominent at others. The Wan's dyke takes a somewhat serpentine course from east to west. Standing on the Wan's dye at Tanhill, and circumscribing a circle with a radius of six miles, an area is embraced of about 70,000 acres of land, resting on the chalk formation, with considerable tracts of the upper greensand, and the soils are proverbially healthy for sheep. Over this district there is, in many parts, one sheep to the acre, and the total amount of stock was computed, in July, to be about 50,000 sheep.

The system of management consists in folding the sheep on fallow land or green crop, according to the season, extent, and quality of the down, to which the sheep are driven every morning from April to November. Each farm has therefore a certain amount of arable ground in the vale and a strip of down on the hill. These strips of down are often connected with the arable land by a mere right of way or small strip of down, and the downs are limited for each farm by some faint undulation or mark, which we often failed to recognise, and which shepherd and farmer alone can define. Practically the downs are quite unenclosed, though legally we understand that the land apportioned to each farmer is looked upon as fenced, so as to protect him from intrusion, and is considered enclosed ground. Our readers may imagine in what sense this may be accepted, when we tell them that we have ridden and driven for miles on the downs, straight through all the infected farms, without deviating right or left, and without passing ditch, hedge, stone wall, or gate.

Standing on an elevated spot, the flocks are seen in every part

moving side by side, one after the other, crossing each other's track, and affording ample opportunities for communion amongst the shepherds.

The district is traversed in all directions by driftways, so that drovers can pasture their sheep on the downs for days, and go from Bristol to London with the payment of a single toll, or from Southampton to Ilsley, &c., in the same way. An extensive dealer has assured me that many hundred sheep driven for many days along the Wiltshire downs cost for travelling expenses 4s. a day. No money is needed for food, shelter, or tolls.

There are some notorious dealers who have no farm or down on which to keep their flocks. They pick up odd animals at a low price, here and there, and drive over the downs, where they sleep, and move gently backwards and forwards on the pretext of travelling, but in reality getting food for their flocks. Many instances have occurred of the spread of contagious disorders, such as scab, the foot-and-mouth disease, foot rot, &c., from these infected flocks passing over the downs along the Wan's dyke.

The lowland portion of the Allington farm is skirted by the canal, and it is said that the sheep were near this canal when the disease first broke out. I find, however, that the first case occurred amongst a portion of the flock that had been daily to the down for about a week. My authority is the shepherd who drove them.

I visited the downs repeatedly, rode across them with gentlemen who knew the country well, spoke to drovers, shepherds, and other persons, and the more I inquired the more evidence did I obtain in confirmation of the facts gleaned by me the first morning I commenced my investigations.

My inquiries abroad indicate that of late years, but especially in 1861, and early in 1862, small-pox has been raging severely in the countries whence we derive stock. There have been no seizures of infected sheep, but many have undoubtedly been introduced in this country. Many were imported in the spring. With all these facts, I think the evidence is as complete as we need have it with regard to the contamination of the Allington flock. The very fact of that flock being away from public roads endangered it, and rendered the chances greater that drovers' sheep would feed by its side.

The Allington flock communicated disease to the sheep on Mr Harding's farm at Etchilhampton. Then Mr Stephen Neate, whose lands adjoin Mr Parry's, discovered the malady, but only after having been to a fair at Marlborough with a lot of lambs. Fortunately Mr Neate was so quick in getting back the lambs he had sold that they led to no further outbreaks. I ascertained the existence of the disease at Stanton, Horton, Hillwood, Avebury, and Langley farm. There was no mystery as to the communication of the disease in any case, with the exception of Mr Church's flock at Hillwood, which, however, was folded by the roadside, where thousands of sheep are constantly



passing. The extent of the loss sustained in Wiltshire is shown in the subjoined table.

TABULAR STATEMENT AS TO SMALL-POX IN SHEEP IN WILTSHIRE.

Name of Farmer.	Name of Farm.	Total Amount of Stock.	Losses before Inoculation.	Number of Sheep Inoculated.	Total Losses.	Date of Outbreak and Inoculations.
Joseph Parry ....	Allington .....	1711	200	800	500	1st July 1862. Inoculated 2nd and 7th of August.
— Harding....	Etchilhampton	400	18	380	19	22nd of August. Inoculated 3rd week in August.
Stephen Neate ...	Allcannings.....	1000	14 cases but no deaths.	976	80	23rd of August. Inoculated 26th and 27th of August.
John Simpkins ...	Stanton.....	100	...	None.	2	End of August.
Thomas Giddings	Horton.....	450	...	None.	2	27th of August.
Thomas Church..	Hillwood.....	360	...	None.	15	27th of August.
William Hulbert	Langley Farm..	400	3	380	140	30th of August. Inoculated 15th and 16th September.
Isaac Dark.....	Avebury .....	400	...	None.	2	12th of September.
Simon Hitchcock	Allcannings ....	300	None.	300	19	Inoculated beginning of September.

Had all the flocks seized been inoculated, I am quite sure that the outbreak of small-pox would not have been brought to so quiet a termination. Had I inoculated Mr Gidding's, Mr Dark's, and Mr Church's flocks, I have no doubt whatever that many more farms would have been infected by this time; and it is satisfactory to notice how very insignificant the losses were amongst the non-inoculated as contrasted with the inoculated flocks.

The losses on 3811 sheep were 221 before inoculation had been practised, and the loss since has amounted to 537, or a total of 758 on 3811, viz., very nearly 10 (19·89) per cent., whereas on 1310 sheep not inoculated the loss amounted only to 21 sheep, or 1·6 per cent.

On all the farms where the separation system was carried out, the cases were very severe, but removed as a rule before they could contaminate other animals. The exception to this was Mr Church's flock, in which one or two mild cases were observed late. The mortality on the cases at Hillwood was as high as 70 per cent., so that it could not be said that the disease was not virulent in character. Again, at Horton the cases were very severe: one animal recovered with difficulty, and the second died from a confluent variety of the disease. They were both confluent cases that I examined at Avebury, and one of the sheep at Stanton was very severely affected.

I cannot pass over in silence that contagious disease amongst sheep, which, not a little to our disgrace, annually commits serious ravages—I mean,

#### SCAB IN SHEEP.

In 1862, the outbreaks of this malady were very numerous in the south of Scotland, in Lincolnshire, Cambridgeshire, and most of the sheep-rearing counties through which driftways are common. This malady deserves a special inquiry, inasmuch as there are districts quite free from it, and others that are severely affected by it. In this respect it does not differ from pleuro-pneumonia in cattle, or other contagious disorder.

A very extensive Highland flockmaster observed a slight importation of the disease in a part of his stock last season. He turned round to his shepherd, and exclaimed, that if they allowed such a disease to lay firm hold of their sheep, it would be a disgrace to master and man; and it is universally acknowledged that negligence encourages the propagation of such a disease, whereas, by active management, it is speedily got rid of. This applies to every flock, and though scab never does, and indeed cannot, develop spontaneously, it is, as with small-pox in sheep, inattention to the first cases, and ignorance as to the management of stock when the disease is spreading, that ensures its perpetuation.

Many instances have come under my special notice of scabby sheep sold in markets after having contaminated many thousands, and re-sold, to continue their work of destruction. It would be impossible to devise a better system than that in force in this country, to ensure the greatest amount of annual destruction by this parasitic skin disease, and in addition to the malady numbering many victims itself, the remedies constantly used prove often as destructive to the sheep and other animals as scabies itself.

There are many islands free from scab; there are Highland districts free from the disease, and the whole country might be in the same position. If the farmer and his shepherd think it a disgrace that such a malady should get the better of them, surely it is a hundred-fold greater disgrace that we should permit our markets and railway trucks, roads and driftways, to be the constant means of propagation for so foul and destructive a malady.

Farmers spend freely in smears and dips. They use that which kills sheep as well as insects, or that which stains the wool and deteriorates its value. We believe that washing, smearing, and otherwise dressing the fleeces of sheep, to be salutary and indispensable operations; but why neglect other direct means of ensuring, that the sheep farmer shall not be tormented and impoverished by one of the most easily prevented diseases which afflict domestic quadrupeds.

#### CONTAGIOUS DISEASES AMONGST HORSES.

Horses suffer rarely from epizootics of a malignant type, such as



the lung disease in cattle. The malady reported on chiefly has been glanders, which exists in isolated districts in Britain, occurs very generally in Ireland, and is due to a great extent to contagion. If proper management of horses and good ventilation of stables have done much in Britain to preserve us from this pest, it must not be forgotten that our immunity as contrasted with any part of the continent depends not a little on the absence of much importation from other countries, and chiefly on the fact that we breed and export. The official returns abroad constantly allude to the outbreak of glanders from the purchase of infected horses, and some of the best informed veterinary surgeons in this country say, that of the comparatively few cases of this disease in Britain, the majority are due to contagion. Thus the west coast of Scotland suffers from Irish horses brought over; many mines are attacked, from the purchase of infected animals; and it is in the stables of cab-hirers and omnibus proprietors, who buy from all sources, and often screws, or imported animals, that the disease especially rages. Not a few cases of glanders and farcy in man were recorded during the year 1862.

#### ENZOOTIC DISEASES.

Under this head I have to draw special attention to the very remarkable changes which appear to be taking place in the nature of prevalent maladies of purely local origin. There is annually an increase in the number of victims to that class of diseases dependent on plethora, and, as repeatedly noticed by me before, splenic apoplexy is becoming more common, and the diseases well known by the names of black quarter and red water, are diminishing in frequency. Sheep suffered, however, not a little from the latter disease in Ireland in 1862, and it presented the well-known characters of enzootic hæmaturia of the ox tribe, being due to the wet state of land on which the turnips, fed off by sheep, were grown.

Of the diseases associated with anæmia, we have, as usual, to record the fatality of rot. Practical farmers have been dissatisfied with descriptions of the disease by scientific men, and this will always happen until a system is organized whereby special outbreaks of disease in animals are investigated in districts, and reported on as observed there. Thus when veterinary surgeons state, and correctly, that rot is a disease of wet lands, it must not be supposed that they deny the occurrence of the malady on the hills, and on dry ground, but when these exceptional outbreaks occur, exceptional causes, such as the purchase of stock already suffering in the earliest stages of the malady, may be discovered. There are, however, various forms of rot, and we hear persons refer to the liver or fluke rot, the water rot, and the hunger rot. It is much to be regretted that such vague names are applied to diseases closely allied to each other, and which in fact consist in anæmia, though that anæmia differs in its origin in different cases. Thus a flock of ewes starved during the winter are apt to die off at lambing

time, or a little before it, in backward seasons. The want of proper nourishment undermines the constitution, and the animals manifest pallor of the skin and mucous membranes, emaciation, tendency to swelling about the head and throat, and, in fact, most of the symptoms of rot; but as the livers are found healthy, the cases are ascribed to the hunger rot. A similar anæmic condition is apt to occur during wet seasons and on wet land, when the sheep are apt to scour, and be much weakened by the bad food they collect. Most of the symptoms of ordinary rot occur under these circumstances. It is, therefore, evident that special attention should be paid to the form of disease reported as rot in any locality, and when the cause is ascertained, prevention is comparatively easy.

I cannot pass over the subject of foot-root without special remark here. The disease prevailed to a very great extent amongst sheep in 1862. As usual, it was most prevalent on lowland pastures, and it is undoubtedly a fact, that sheep suffer severely from this disease if the feet are weakened on soft damp soil. In order to preserve horn in a perfect condition, whether in a horse, ox, sheep, or other hoofed animal, it is essential to keep the feet dry, and the best and soundest hoofs are therefore seen amongst sheep, goats, and other such animals when kept where they can climb rocks, and get their hoofs properly worn down without ever falling into a weak and pulpy state. When the hoof gives way, the secreting band round the coronet becomes inflamed, and suppurates; granulations sprout up, and then we have resulting that condition of the feet in which apparently fungoid excrescences become voluminous, and lead to the appearance described in cattle or sheep as 'foul in the foot.'

#### SPORADIC DISEASES.

I need not enter into any details under this head. Much careful information is to be gleaned from the printed reports, and it will be again found that horses are chiefly destroyed by diseases of the digestive and of the respiratory organs. Of the maladies of the digestive organs, colic is the most deadly, and of the thoracic disorders, pleurisy kills the largest number. Colic is far more prevalent in Scotland than in England or Ireland, and though fatal in its character in a large proportion of cases wherever it may occur, still the practice of overloading the large intestine of the horse with sloppy mash, as practised in Scotland, is apt to be attended with very serious results.



*Supplementary Description of Component Structures, and further Observations on the Economy, of the Horse's Foot.* By Professor GAMGEE, Sen., New Veterinary College, Edinburgh.

(Continued from page 356.)

SINCE writing the former part of this communication, doubts have occurred to me as to the practicability of treating my subject in as plain a way as was desirable, in writing with a view to make important questions in reference to the locomotive functions of the horse generally understood, some anatomical details are essential for demonstration.

In order to show the notions that prevail—which represent the teaching of the whole of the present century at our veterinary schools—I may cite another author, in addition to that most reliable authority on the state of veterinary knowledge, in his time, quoted in the former part of this communication. In Blaine's "Outlines of the Veterinary Art," edited by Mr E. Mayhew, page 82, the author says:—

"The inner splint bone is more liable to disease than the outer, and for two supposed reasons—firstly, as is said with much plausibility, because it is more under the centre of gravity; and, secondly, because it receives the entire weight of one of the lower row of the bones of the knee, and hence more likely to be driven downwards, or put upon the stretch."

Without undertaking a fruitless research to ascertain the first source of the erroneous notions that have obtained such strong hold on the minds of men, that it may be doubted whether they will ever be removed, I will quote one at least who saw correctly, and related the truth; and if it be argued that it is not the whole truth, I answer that it is nothing but the truth.

George Stubbs, in his grand work, "The Anatomy of the Horse, Illustrated" (1766), says:—The head of the inner metacarpal bone articulates with the trapezoid of the carpus." In this short, plain description, about as much is said as this original worker usually gave of parts. His work is remarkable for simple brevity of expression, and for the beauty and clearness of his drawings. In saying that the inner small metacarpal bone articulates with the bone of the carpus above, Stubbs did not exclude any other phenomena in connection. The several other articulations of these bones are passed over; and subsequent teachers who had had the work of the greatest original anatomist of the horse, of modern times, before them, who, writing or teaching fifty years later, were in duty bound, before altering or adding, to dissect the horse, in order to confirm what was correctly given, and then to have filled in more details, if required, taking care that the new matter was equally correct with the old.

It is remarkable, and also regrettable, to reflect, that whilst the ana-

tomy of the horse has been systematically taught in England for at least seventy years, such a mixture of error and truth should have grown up in parallel ratio. Could one conceive it necessary, under the laws of Providence, that, like "the tares and the wheat," errors must be left alone for a while, some consolation would result from such conviction; for my own part, I cannot entertain that view, but rather seek to discover causes. It is evident to every worker in the field of inquiry now, that much which relates to the economy of the horses' feet and legs was wrongly conceived from a very early epoch after the establishment of the London Veterinary College.

When John Hunter dissected the horse, and contemplated the structures of that animal comparatively, how differently the great anatomist must have worked, free as he was from those hypotheses which, in after times, stood in the place of sterling knowledge, and which obscured the clear view of another great man, one of Hunter's followers, Sir Charles Bell. The erroneous notions that have prevailed in the veterinary profession, up to the time we are writing, on the economy of the foot, far outweigh all that has been correctly stated, and established as useful knowledge of late years on the same subject.

I shall now endeavour to describe some of the phenomena belonging to the knee. This joint is so important in the economy of the horse, that all who have anything to do with that animal, cannot fail to pay some attention to its movements, which are peculiar to him, over those in any other animal. Fine knee action is the first feature which strikes one, as a horse is seen going in the trot.

The knee of the horse requires to be observed in the living subject in his various movements, and also by dissecting the structures after death. The latter is the only way of acquiring an understanding of the functions in detail; whilst, to understand action thoroughly, it is essentially necessary to see the movements connectedly in the living horse. The two modes of observing should be made mutual helps.

I shall make some remarks on the structures which are necessary to show my views on functions, whilst the general anatomy may be acquired by dissection, and the work on that subject by Messrs John Gamgee and James Law, will prove of essential use.

In speaking of the knee it is customary to call it a joint. This is liable to lead to the increase of incorrect notions, because the part, so called, comprises within its limits four joints, three of which are very extensive, the lower being defined by the upper surface of the large, and the two small metacarpal bones together, and by the under surface of the three knee bones of the lower row; the second and middle joint is still more extensive, it is circumscribed by the capsule, between the three bones of the lower, and the same number of those of the upper row; the greater extent of this joint compared to the first described, arises from the larger surface of articulation which exists between the bones of this joint, it being endowed with extensive liberty for motion. The last to describe of the three large joints of the knee is formed by the four bones of the upper row and



the radius. This joint, for extent and degree of motion furnished, resembles the last described, or middle of the three carpal joints.

The fourth joint is formed by the connection of the pisiform with the cuneiform bone, and is an independent articulation which gives a kind of hinge motion to that bone.

There is no other joint structure, that I am aware of, endowed with such extent of easy and exact movements as are displayed in the knee of the horse. Eleven bones enter into the formation of this combination of joints. Nothing in recent times has been added, to the oldest knowledge which has come down to us, on the economy of the horse's knee.

"If the colt, in moving, bend his knees freely, you may conclude he will do so when he comes to be rode; for all of them, by time and use, acquire a greater freedom of motion of their knees. This is an excellent quality, and those horses which want it are more than apt to stumble, and soon tire."—*Xenophon*.

Some excellent independent observations on the knee and hock joints are made by Dr Carson, in his little work on the "Form and Action of the Horse," which are worthy of perusal.

The notions which have been most extensively promulgated on this subject are those propounded and held by the late Professor Coleman, notes from whose lectures run as follows:—"The knee of the horse corresponds to the hock in the hind extremities . . . the bones are placed in two rows, the upper, articulating with the radius, has extensive motion, the other articulations have but little motion, and are only for the purpose of preventing concussion." Further on Professor Coleman says, that "the upper row of bones are placed like bricks in the act of building, &c."

The foregoing apology for an account of the construction of the knee is infinitely more at fault than any popular notions on the subject, to say nothing of those held, and descriptions given, by good judges of the horse's action, who have written at remote periods.

The notion on the structure and functions of the knee, given some sixty years ago, have simply been taken for granted as right and sufficient; so that nobody has set to work to improve on, and advance the knowledge.

Instead of the knee formed, as is said, of a number of bones distributed in rows, superimposed one upon another; being so constructed solely for giving strength, and preventing concussion, the function of each bone is accurately defined, and is demonstrable in character.

To say that the motion of the knee is limited to the liberty afforded between the upper row of carpal bones and the radius, is calculated to misdirect men in pursuit of correct knowledge on the horse's movements.

The knee of the horse has no exact parallel, though an intimate analogy in character and function, to the human wrist, and also to the corresponding structure in all quadrupeds. I will observe, first, on the metacarpal bones, upon which those of the knee repose, and

having given what I believe to be a right account of the functions of the two splint bones, the necessity for following up the description appeared when I came to read over much that is currently assumed on the connection, structural and functional, between those and the carpal bones above. Considering the great part the knee acts in the economy of locomotion, its extent of motion, strength, and leverage properties, could only have been conferred by its marvellous combinations, and by being composed of several bones, each endowed with the most exact motion, limited or extended, as their office requires.

On looking at the head of the large metacarpal bone with that of the two small or splint bones, I find an adapting surface for the carpal bones, such as is very instructive in interpreting function. The head of the cannon bone is mostly given for the bearing of the largest bone of the knee, the os magnum, and regarding these bones together, the axis of bearing is precisely through that largest bone of the knee, and in a given direction through the cannon bone; the two splint bones, having a slight degree of motion, require corresponding moveable connection above, and if the lower bone of the knee had been composed so as to have rested on the heads of the three metacarpal bones, the required movement of the two splint bones would have been wanting, and fracture of so large an intervening bone would have occurred, in fact it were incompatible. The inner metacarpal articulates above and anteriorly, in a slanting direction from above downwards, with the os magnum, its larger surfaces posteriorly being connected with the trapezoid.

On the outer side the small metacarpal bone, which is placed more backward than the inner, having its head more prone for attachments, articulates only with the one bone of the knee, the unciform. The surface presented by the heads of the metacarpal bones together affords, I repeat, a means of judging of the combined functions of these with the three carpal bones in connection. We see confirmed that which examination of the joint, before exposing it, showed, that motion between the bones forming this lower joint is extremely limited: this is shown by the close attachment of the six bones which articulate. The sharp edges of the head of the cannon, and corresponding adapting surface of the os magnum, show that the extent of motion between the two is simply that which the interposition of synovial fluid provides for the firm bearing surface between the magnum and cannon, where the surface of bearing in all exertion in a full-sized horse is one inch and five-eighths from front backwards through the centre, and two inches and one-eighth transversely from side to side.

It is amply shown by the construction that there is provision made for the bearing downwards in the axis, through the largest bone of the knee of the lower row and the large metacarpal; and here it may be added, that precisely the same phenomenon may be observed in the hock, where the two large cuneiform bones, placed one over the other, form the sole medium between the astragalus and the



large metatarsal, and through these bones is to be found the axis of bearing, the whole of downward pressure in the hock is sustained by three intervening bones between the tibia and large metatarsal.

Returning to the fore extremity, we may find that the up-lifting function, which is a main office of the splint bones to facilitate, by giving hold for attaching tendons and ligaments, requires corresponding adaptation with the knee bones above, and, accordingly, one of the several functions performed by the trapezoid and unciform bones is to co-operate with the splint bones. The downward and backward pressure from above occurs at the instant when the greatest exertion in an upward direction is being acted on the splint bones in both fore and hind limbs alike.

The reflex action of the passive structures of the horse's foot, which for extent of exquisite movement and power have no exact parallel in comparative anatomy, is exerted between the knee and hock respectively, and the anterior bearing part of the feet, and in the action the component structures of these joints play most influential parts.

The two smaller bones of the lower row of the knee, placed on each side, posteriorly to the largest, are endowed with slight but exactly prescribed motion, which is backward when the knee is relaxed in flexion, and forward with the upward pressure given at every step in action, these bones move a line upwards also, but not downwards, which, from their connection and their own ligaments, is physically impossible.

To give the inner small metacarpal bone great increase of resisting power for sustaining upward stress, it is connected with firm adaptation to the os magnum, whilst the outer bone only articulates with about a third of the lower surface of the knee bone immediately above it—thus showing, where exertion is most required, the necessary strength is given.

I shall pass on, after what I fear some readers will find a tedious account of the lower of the joints of the knee, which being endowed with so little motion, would not have required more notice than I shall deem it necessary to give to the others, but for the necessity of dispelling the erroneous notions promulgated on the structures and the actions attributed, viz., the descent of the splint bones, a movement foreign to their assigned function.

The knee bones constituting the upper row having been sufficiently described by anatomists referred to, I may briefly say that the middle bone, and the inner—the largest of the upper row—divide between them the chief bearing functions, which they transmit to the os magnum mostly; the inner or scaphoid bone gives a deep socket adaptation to the round upper surface of the inner one of the low row, the bone which has given occasion to the already discussed considerations on its connections and economy.

The cuneiform bone moves on the round upper surface of the outer bone of the low row, similarly to that described of the inner; instead, however, of the ball and socket structure being so complete, the con-

cavity in which the lower bone revolves is formed partly by the semilunar or middle one of the three bones of the upper row in the axis.

The uppermost joint of the knee is formed by the four bones which compose the upper row, and the radius. One of the bones of this row, the pisiform, as has been already stated, receives no bearing, as both its articulation with the radius, and its independent joint connection with the cuneiform bone, are provisions for the required support and movements of the pisiform bone itself. In stating these facts, I make the largest allowance for the known truth that Nature accomplishes many ends by singular means; thus, whilst the pisiform bone is not destined to support weight from above, it enlarges the sphere on which the lower head of the radius moves, and this observation applies to other bones already noticed, from those of the knee down to the navicular, including the splint and sessamoid bones.

I have now to consider the most important part, the action of the knee, and if I say also the action of the hock, I may say that on the construction and movement of these joints depends the action of the horse; and this proposition may stand without qualification, beyond admitting that the perfect form and movement of these joints implies equally good form, and sound conditions in structures above and below them, in position.

The very extensive action given to the knee of the horse is about equally provided by the middle and upper joints, and by that combined liberty of action, the foot is flexed unlimitedly, until the metacarpal region, including the pastern joint and heel of the foot, can all be made to bend on to the arm completely, with ease.

After taking, I believe, not more pains than I was bound to do before writing on this subject, I may describe the action of the knee as being performed, as follows:—The radius moves on the four upper bones, whilst the pedal extremity, including the lower row of carpal bones, flexes on to the upper row, which I find neither flexes nor revolves, only as it is carried out with the radius, as that shaft is extended, so that, in a great measure, the upper row of knee bones may retain an almost vertical position, whilst extensive movement in the limb is being exerted.

The upper row of bones has, moreover, an action more extensive, but corresponding with the bones below; these, the upper knee bones, have a considerable lateral action; every bone composing the knee, and the hock also, has its assigned function, which consists in an alternate relaxation and compression, under every movement of the limb. The four bones, which form the upper row in the horse's knee, are endowed with lateral action, of a kind and extent which may reasonably be inferred has not been understood, since no one has described it.

As the foot is lifted, and the knee is bending, every bone is for the instant relieved; the upper row of bones of the knee, in the meantime, is being drawn outwards and backwards. The pisiform bone



is acted upon in flexing the pedal extremity of the limb; in the meantime the radius is extended, and the foot is flexed back and upwards, which the rounded upper surfaces of the two smaller bones of the lower row, acting in the socket cavities, facilitate. So flexed and sustained, when the limb is carried to its extent, it is let down in its assigned position, and new action is brought into force, in which act the upper row of knee bones are, by concentration of force, conveying their bearing in an inward and forward direction.

The posterior projections of the carpal bones afford the first points of attachment to that influential and powerful structure, which I have in former papers described, the great ligament which has been so little understood, as regards its structure and function; by the movements of the knee, that ligament is acted on, though the greater effect is produced by its attachment to and combined influence with the cannon bone, the lever which has a principal share in producing action.

I have now noticed the most considerable structures in the fore leg, from the knee inclusive downwards, which are concerned in and promote progression; for want of time and space, I cannot devote the same notice to the hock, and its special function in the economy of the hind extremity.

More notice has been taken by writers, of the hock than of the knee of the horse, yet there is room for more being said. It has attracted the more notice, without much reason for the preference, through the hock being the seat of derangement and lameness most commonly; but a little more attentive work, by men whose minds are free from incumbrances, will enable them to see that both joints form a part of the foot structure in the respective limbs, and that a false position given at the sustaining extremity re-acts on the structures at a remote point, and if the effect is shown most commonly, in the foot in the fore limb, and in the hock behind, the solution of the reason why is not the less possible, but rather one that will receive attention. Dr Carson, in his work on "The Form of the Horse," already referred to, enters on this question of cause in a way that commends his little book to readers, which, if weighed in the balance with the heavier productions on the subject to which it is devoted, it should raise some of them on to the shelf, where they might lie harmless.

It may be briefly stated that the hock has a more limited action than the knee, though its movements are of the most exact kind, and, taking the movement which prevails between the tibia and the astragalus, it is greater than that which either joint of the knee singly admits of. In the hock, there is no other movement than that just mentioned, viz., between the tibia and astragalus, besides that which subsists between the several bones for their respective economy; the cuboid and small cuneiform, with the small metatarsals, fill the same office in the function of the hind limb, as the analogous splint bones and those immediately above perform in the fore.

A good deal might be said, if time allowed, to show how modifications

in the construction of the two joints, consists with harmonious movement, and as these matters become more known we shall not hear so much absurd talk as has long been common about props and propellers, assuming that the fore-legs are mere weight-bearers, whilst the hind send the animal machine along.

It is because unavoidable and beyond my control, if this subject has necessitated more *technical* reference for its elucidation than was desirable; no one feels more than myself, that some devotion to the anatomy of the horse is essential to a comprehension of the physiology of locomotion, and, as already stated, observations carried on constantly on the living horse, are most essential to the understanding of action. We know of hundreds of men who are judges of the various paces, of the class of horse they are most accustomed to, who are unacquainted with the first rudiments of anatomy; but we never knew a man who, by examining the structures after death, and who did not pay due attention to the living horse, to become a thorough judge of the animal's movements.

The whole subject will only be learned by using the many available means. Much industry and not a little time are essential, and it must be admitted that some correctly laid down first principles are not to be regarded amongst the least necessary helps.

When men are looking at a horse, his legs in particular, and taking a side view, they like to see a flat leg, between the knee and hock and the pastern joint, with well-defined lines, which mark the course of tendons, &c.; and, in the main, they are right; such formation, besides excellent in itself, is the common accompaniment of other good qualities. But it is the complex structures, above and below, on which the intervening parts depend for their form and the maintenance of healthy condition. In the lateral view three prominences and two concavities are seen in the blood horse, which must be taken as the type; the anterior of these convexities is formed by the cannon and splint bones, the middle by the great flat ligament filling up the space from side to side behind the bones; and the third is the large round mass, consisting of the two tendons of the flexor muscles, and a branch of the great ligament just mentioned.

The space between the elaborately constructed joints, is where structures are seen, may be felt, and where effects of injuries are most easily discerned, but the first causes remain hidden from the non-sufficiently instructed observer; and conclusions drawn from such empirical habit lead to wrong judgment, from which torture to horses becomes the consequence.

Where no pains are taken to understand character and cause, why horses' feet and legs fail, men are not usually scrupulous to act; blistering, setoning, and firing, are most cruelly had recourse to, where very different procedure is required, and where in too many cases nothing at all should have ailed the horse. More perfect development of the colt's feet, and preservation of the horse's, would be the happy results of a thorough understanding of the subject.



Every now and then we hear of some renowned horse having broken down, and not unfrequently the subject of injury is a great Derby favourite, or one that stands high in public esteem for some other forthcoming race, which makes the horse of extraordinary value, even to the extent that no reasonable sum would command him, just previously to the announced lameness; and when such an event is spoken of as one of the commonly occurring accidents, lameness is regarded as a necessary effect of unavoidable causes, and people speak of a broken-down horse with about the same concern as they would of a broken vase more or less precious.

The very vagueness of the terms used to describe these accidents, should be sufficient to set inquiring minds thinking.

A most common answer to inquiries about a horse that falls lame whilst running, or when in training, is, that his suspensory ligament has given way. What the big phrase means, or what structure, and what part has sustained the real injury, we are left to surmise; in the meantime the horse's career closes, and he is heard of no more on the turf.

When poor Taplin, three quarters of a century ago, wrote on the diseases of the gall bladder of the horse, he brought upon himself the ridicule of the followers of veterinary science of the time and subsequently; and yet how much more important, in a practical point of view, is it to understand the component structures of the horse's foot and limb, with their functions, than was the question of how the secreted bile passed from the gland to the intestine, in the horse as exceptional to the general law; in the case where Taplin's ignorance was proved, the secretion went on without his knowledge, but the health of the foot and limb, hence, the worth of the horse, is dependent on an understanding of their economy, on our part.

Men apply themselves to the study of anatomy, with various aims as to the application of their knowledge; and if the veterinarian does not find frequent occasion to call into play such consummate skill in the performance of operations as the surgeon; or if, with reference to the highest aspirations of the philosophical anatomist, we may be contented to see, by borrowed light; the question is very different when the locomotive system is under contemplation. To the leading men in veterinary science, the public ought to be able to refer with confidence for all that relates to perfection in animal locomotion, because our chief subject, the horse is the most perfect animal known for his beautiful action and power combined, and because the attainment of these high qualities demands the greatest combination of talents that the management of the horse calls for. In vain might the comparative anatomist attempt to understand the economy of the horse's foot from the study of that structure in other animals, and yet no anatomist could go from examining the human foot to dissect that of the horse, without greatly increasing his conceptions on phenomena and laws, having a wide relative application.

I hold it to be essential, that we do not, in looking at the horse's

foot, take the limited view, but the whole, viz., embracing, at a glance and thought, knee and hock, with all the structures below. This, learned men own, is the zoological arrangement. Yes, and it is the simple, because the true and only right way to learn the functions. It is not the names of parts I contend for; the familiar names of foot, pastern, and knee, indicate well the parts to which the names apply—it is not to substitute new terms, but to add correct knowledge, that we should devote our energy. Readers desirous to enter into the subjects treated on in this paper beyond what is here given, are recommended to refer to another communication contained in the *Edinburgh Veterinary Review* for April last.

In conclusion, I will attempt to afford a practical way of solving some propositions submitted at different times by myself.

If some complain at my repetitions, I rely on the real searchers after truth to consider the solicitations required for the admission of new views into new circles, therefore I shall repeat, in altered form, some things which I have said, which I hold to be important, and which have not yet received any response.

All that I have been saying about the action of the knee and hock, of the bones which sustain, which form pulleys, buttresses, &c., and of the strong ligaments, not to connect, but which run parallel with the long bones, all these and more belong to the general question.

“We must never forget that it is principles, not phenomena,—laws, not insulated independent facts—which are the objects of inquiry. . . . What tortures, inflicted on patients by imaginary cases of incurable diseases, might have been dispensed with, had a few simple principles of physiology been earlier recognised!”—*Sir John Herschel*.

Employing the necessarily accompanying key to my whole system, I stated formerly that the notions, which coupled shortness between the knee and fetlock in the fore, and between the hock and fetlock in the hind limb, with perfection of form, was founded on and kept up in error. I need hardly say that my position has never been contested, nor, as has been said, has my showing of these truths received any notice.

To anatomists especially I addressed myself on former occasions, when describing the length of the metacarpal and metatarsal bones, and since these can only be measured with accuracy in the skeleton, I will point out the way in the living horse, by which, instead of the inquiry being confined to a very few, every man who has three good horses in his stable may work out his own proof.

We constantly hear short-legged horses spoken of approvingly, and as the converse, long or leggy horses alluded to, as cast-off animals. Surely there must be truth in this; men have seen with their own eyes, and agree as to which is a short, and which a long-legged horse, and experience has informed which of the descriptions is commonly good and bad respectively, and yet the first appearance is deceptive.

Length of cannon bone in both fore and hind legs is essential for speed, and also for power and endurance.



As we cannot measure the cannon bones with sufficient exactness in the living horse, I have tried, and find that we get at the measure fully to answer our purpose for solving the question, by taking a tape measure, from the upper surface of the projecting bone at the back of the knee, and carrying it straight down over the pastern joint, to the bottom of the hoof on the outside, in the middle of the quarter; and in the hind leg, measure from the top of the point of the hock, carrying it down in the same way.

The difference of length in the measure will be within a fraction due to the variations in the length of the cannon bones; we cannot measure the angles with accuracy any more than we do when we take the height of a horse from the top of his withers to the ground.

I shall invite gentlemen to test the truth by comparison, rather than by laying down rules for finding the length of the shank bone in horses of different heights of the same breeds.

*Firstly*, I will select what in popular language are called wide-framed short-legged horses, which will be found to give the longest measure in the points indicated.

*Secondly*, I will take the winning horses against losers amongst those in training.

As the type of the wide powerful horse I shall name Newminster, which horse will be found to measure as long, if not longer, than any horse that can be found of his height, and if tested by comparison with any common-bred horse, the advantage of length on the side of the blood horse will be very marked; and if I were to choose amongst the mares, I should point to Caller Ou against any of her height, however much longer on the legs they might appear. Again, going to first-class horses on a larger scale, and of greater height, such as Voltigeur, Stockwell, Rataplan, and Wild Dayrell, these will all be found to give the longest measure in their cannon bones of any horses of their height, and taking the best three-year-olds of the present time, of which, colts and fillies are divided amongst some half-dozen or more stables, let any one of these be measured, and compared with its stable companion of the same height, and the greatest length between knee and hock and the pastern, will be found with the best horse. To exclude the chance of misconstruction, I will repeat, that no horse can possess superior speed which is not long, by which I mean symmetrical, from knee and hock to the bottom of the foot.

Secondly, that such formation is as necessary for power to carry weight, and for endurance of long exertion, as it is for speed: instance the ass, the mule, and the camel; and going further, to comparative anatomy, see the ostrich. The metacarpal bones of the fox are considerably longer than those of the largest Newfoundland dog. And though I have not had an opportunity to examine the wolf, I have no doubt that the same phenomena will be found to prevail, the ascertaining of which will help to account for that animal requiring two

packs of fox-hounds to overtake him, the second to be laid on when the first is tiring.

*Exceptional Examples.*—Whilst I state that the horse with length of shank bones will be found first in the race, in the field, and at the end of a long journey, I am aware that one of such form may be found amongst the last also. There are more good formed, well-bred horses spoilt than are brought out to perfection. And the best, under bad management, may render the least service.

I should not find much difficulty in giving an approximate scale of proportion in the length of the shank bones, which would be found to form the highest standard of perfection amongst horses of the same breed of different heights; but I prefer to leave the matter for the present. I have never relied much on measurements as a test of horse power, and so far as I have yet seen them used, the tendency is to bewilderment and error. The eye and the mind form the best standard tests for horse quality. Still, as the painter measures his canvass, and the sculptor the height for his intended figure, so may we draw a few lines for guidance and helps to memory.

Nature has designed the animal frame to be symmetrical; thus we are sure to find a due increase in length of shank in going from Newminster to Wild Dayrell, or else they could not have been the winners of races which require a close approximation of equality in speed and endurance.

Some correct observations were made three or four years ago by Mr Ekie, in a letter published in a sporting paper, wherein he took up the question of comparative measurement in girth, and tried to prove, and I think successfully, that in comparing the stallions Sir Tatton Sykes and Sweatmeat, the latter, though measuring least, was the best proportioned horse.

In apologising to the reader for having extended this communication so long, by which important anatomical phenomena, great physiological principles, and practical observations, are found in common, I can only say that to hope to effect any good by attacking one error, or advancing a single suggestion at a time, would require a younger man than myself, and it is doubtful if then, by a slow process, much good would result.

Every day's experience proves to me, that nothing sticks like error, it is self-acting, accumulative, requires no industry, no thought, and loose ideas, without being too nice about the truth in throwing them together, are all compatible for the time with a state of things that ignores the highest privileges of man, for whose use the noble horse is given.

ERRATUM.—In the first part of this article, page 356, 12th line from bottom, for “unciform” read “cuneiform.”



*Calculus in the Intestines.* By C. J. WHITWORTH, Boston,  
Lincolnshire.

ON Thursday afternoon, March 26, 1863, I was called upon, at three P.M., to attend a horse in the coal pit at North Cowpen, the property of B. Foster, Esq. On my arrival I found the animal down, and in great pain, occasionally rolling on his back, also dashing his legs about violently, which was fully indicative of inflammatory attack (enteritis); the pain was so persistent and severe, and agony so great, that he was anything but safe to approach. I made a few inquiries as to history of case, when the horseman informed me, he noticed the animal amiss about one A.M., looking dull and evincing pain; also observed he had not eat in his usual manner during night, neither had he voided excrement; so he properly gave the animal a physic ball containing

R Aloes Bbds. ʒvi.

Nothing more was noticed, than his appetite lost up to one P.M., when he had a relapse, on which occasion I was sent for.

I examined and found visible mucus membranes much injected; mouth, body, and extremities hot, with pulse full, hard, and bounding (45); the horse still remaining down, dashing his head violently on the ground. I at once opened jugular vein, and extracted about seven quarts of blood, until pulse began to falter, which afforded some temporary relief, and had him got up, gave a clyster of warm water, at which time he ejected large quantities of dense mucus from the intestines, the mucous coat being paralysed through pressure, hence the sloughing, but no fæces ejected. I gave the following drench, as the animal was not free from pain, &c.:—

R Tinct. aconite, guttæ x.  
Hyd. chlor., ʒj.  
Ol. lini, Oj.  
Misce pro haustus.

I also blistered the abdomen, and gave orders for him not to have anything to eat, but what he pleased to drink. He remained in this state up to half-past three, when he again showed symptoms of severe pain, so I had recourse to a sedative drench, composed of

R Ext. belladonna, ʒj.  
Tinct. aconite, guttæ x.  
Æth. nit. ʒij.  
Misce pro haustus.

Soon after this time the animal appeared somewhat relieved. I gave him another clyster, which was ejected without fæces; on introduction of the hand per anum, found no dung in rectum, but occasioned great efforts to force it back again. About six P.M., the animal appeared reckless, and commenced pawing, stamping, and evinc-

ing pain, also gathering his legs together to lie down; so I gave the following ball:—

℞ Pulv. opii,      ʒj.  
Hyd. chlor.      ʒss.  
Misce pro glob. j.

In course of a short time he seemed relieved. I remained with him up to eight o'clock P.M., when he showed an inclination to eat hay out of his rack, which I had all taken from him; he at this time drank a bucket of water. I ordered him to be well bedded, legs bandaged and rubbed down, to have water by his side, and injections (*pro re nata*), but nothing to eat until I saw him next morning; I also left a drench to be given if the animal was in pain, composed of the following—

℞ Tinct. aconite,      guttæ x.  
Ext. belladonna, ʒj.  
Aqua distill.,      Oss.  
Misce pro haustus.

The above drench was given about one A.M., on Friday morning, when he was observed restless, and showed inclination to lie down.

On my arrival at 7 A.M., he had just lain down, and had not, up to this time, voided any excrement. I began to think it was a case of no ordinary character, from the recurrence of symptoms, results, &c. I thought it must be a case of intussusception of intestine or calculus. So, under these circumstances, I gave him a physic ball containing:

℞ Aloes Bds., ʒvi.

Also, sedative drench, as he evinced much pain, composed of following:

℞ Tinct. aconite,      guttæ x.  
Aqua distill.      Oss.  
Misce pro haustus.

The horse remained down, and soon appeared more tranquil up to 5 P.M., when I had him walked up to shaft, taken out of pit, down to Cowpen farm, put in loose-box, well bedded, etc., made comfortable for the night, and on arrival he drank a bucket of water, although his bowels had not, up to this time, responded, but he micturated several times, fully proving that, in spite of medicine, and what had been done, it was a case of great obstinacy, consequently gave another drench composed of:

℞ Ol. lini,      Oj.  
Ol. croton, tiglii, ℥ xv.  
Misce pro haustus.

About 8 o'clock P.M., the horse again began pawing and stamping, and gathering his legs together, appeared anxious to get down and in great pain, lying on his side, and occasionally trying to roll on his



back, dashing about his legs, and groaning fearfully, now and then looking towards flank; so I gave following:

R Pulv. opii,            ʒi.  
          Hyd. chlor.,       ʒss.  
          Misce pro glob. j.

Also applied hot water to abdomen, which afforded relief (*pro tem.*) and at 10 P.M., once more had him on his legs, and gave him clyster of tepid water, and he drank a-half bucket of water, but soon began to turn round and gather his legs together, and go down, and there remained until 6 A.M. on Saturday. On my arrival at that time, he was in much pain, and had not passed any fæces, so I gave him a drench composed of following:

R Tinct. aconite,            guttæ x.  
          Pulv. aloes,            ʒiv.  
          Aqua distill.,        Oss.  
          Misce pro haustus.

Also gave clyster tepid water, and he again drank about two gallons of water. So I ordered him walking exercise during the morning. Give water to drink, together with tepid water injections; as it was useless doing further until bowels responded, he was accordingly walked about three or four times during morning, but no fæces passed; and on taking him in his box at 12 A.M., he gathered his legs together, went down, and died in a few minutes. During the whole of this time not a particle of excrement voided; treatment of no avail; in consideration of which, and from the many peculiarities of symptoms and continued pain for so long a time, as well as for the satisfaction of my employer, (Mr C. Hunting), I made a *post-mortem* examination, and found in the hepatic flexure of the colon a large calculus weighing 2½ pounds, which satisfactorily proved to be the impediment and cause of death. On cutting through this calculus, I discovered a nail, embedded in its centre, acting as a nucleus, which had passed down the œsophagus with food, etc., around which materials of different kinds had agglomerated, and hence the concretion.

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*A Horse Poisoned by Veratrum Album.* By WILLIAM MILLER, V.S.,  
          Bradninch.

ABOUT five o'clock A.M., Friday, 22nd May, 1863, I was called in haste to attend a three-year-old filly, the property of Mr Hooper, farmer, Bradninch, which had accidentally got hold of a packet, containing three ounces of veratrum album, and supposed to have eaten two ounces of it. I was in attendance in little more than half an hour after the accident happened, when the following symptoms presented themselves:—

Countenance indicating great pain, a gurgling noise in the throat,

frequent attempts to vomit, followed only by a discharge of frothy saliva. Pulse forty, round, full, and regular; breathing intermittent; the flanks heaved six or seven times in rapid succession, accompanied by a painful grunt; then an interval of repose, equal in duration to the six or seven heavings.

Spasms, at regular intervals, confined to the muscles of neck, appeared to give excessive pain; the muscles contracting drew the head downwards and backwards, which gave the animal for the time the appearance of being very short, and ewe-necked. Membranes of eyes and nose injected; temperature of body natural; walks very stiff.

*Treatment.*—Abstract three quarts of blood. Give one drachm of tannic acid, drenched several times with flour gruel. One hour and a-half after first, gave another drachm of tannin; continued the gruel, half an hour after second dose, the symptoms are changed. Pulse sixty, full, and regular. No spasms of the muscles of the neck; breathing more rapid; paralysis of the hind legs, so much that the animal cannot be moved, fell down on turning round in the stall, but immediately recovered its legs again; cannot swallow. Having little hope of the animal's recovery, and other business to attend to, I left, with instructions to continue the gruel if the animal recover the power of swallowing.

Three hours after I left, a messenger came to inform me they considered the horse better; could move around the stable, and had eaten a few mouthfuls of grass.

Ten hours after the accident, I visited my patient; found it eating grass; all the violent symptoms are gone; and, with the exception of a little stiffness in moving the hind legs, it appeared as well as ever it was, having voided no fæces. I examined the rectum, and found it impacted with rather hard fæces, removed them, and gave aloes Cape, ʒiv. Four days afterwards, the filly went to work.

On making inquiry how the filly got access to so dangerous a poison, I was informed by the waggoner, (Mr Hooper's son), that, with the assistance of a friend, and an old receipt book, he had discovered that white hellebore was a sure cure for a skin disorder another horse was troubled with; he therefore purchased a packet of three ounces, and placed it on a shelf behind the horses. The day in question this filly turned round, examined the shelf, and found this packet. The waggoner had not been absent above three minutes; on his return to the stable, he found the filly quietly munching the packet of poison, paper and all; he collected what was wasted; it weighed one ounce.

Do you believe a horse could take two ounces of powdered white hellebore and live? My opinion is, there was more wasted than one ounce.

[On this point there are differences of opinion. Waldinger has said that 2 oz. of white hellebore root induce salivation, efforts to vomit and action of the bowels without absolute purgation. Bytz, on the other hand, declares 1 oz. will purge and induce gastro-enteritis.—*Ed. Edin. Vet. Review,*]



*Parturition in a Cow.* By the SAME.

ON the 10th of May, I was requested to visit a cow that had calved all right the day previous; but had been bending ever since, as if to expel the cleansing. Examining the womb, I felt a dead calf in rather an unusual position. It presented the lumbar vertebræ to the passage. I made several attempts to alter the position of the calf, but failed. The cow was standing apparently none the worse for her 24 hours' straining to expel a second calf. I introduced a common pocket knife, cut through the spine, removed the viscera, pulled away with my fingers several ribs, and with my fingers separated the scapula from the chest and the skin from the scapula, fixed a cord on the scapula, and pulled away the leg (the leg separated itself from the skin with the greatest ease by pulling); then fixed a hook into the spine. Three men pulled away the calf. Time, two hours and a-half. With the exception of a quarter of an hour the men were occupied in pulling away the calf, the cow *stood* perfectly composed. Gave a dose of laxative medicine; the cow did well.

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*Parturition in a Mare.* By the SAME.

ON April 27th, my assistance was requested to a mare in foaling. The mare had been bad most of the night. I was sent for in the morning; found the mare down, straining violently, all four legs of the foetus beyond the fetlocks out; the foal was dead. I roused up the mare, and endeavoured to push forward the foal. The mare went down as soon as I began to handle the foal. Thinking for a moment how to proceed, it appeared evident to me the foal must be taken off backwards, as the four legs completely blocked up the passage; in what position the neck or head was in, it was impossible to find out. I fastened cords around each hind leg; failed, after several attempts, to pass the knees forward over the brim of the pelvis. I cut off the fore-legs at the knees, then, with very little trouble, I succeeded in passing them forward. With the assistance of two men, I then removed the foal; time, half-an-hour. Ten minutes afterwards, the mare rose and fed as if nothing had been amiss; rested a few days, and then went to her usual work.

The foal had a crooked neck, the head resting on the chest, and adapting itself to the form of the chest; the nose and lower part of the face was curved to one side; the neck could not be made straight when the foal was on the ground; had the fore-legs been out, I think it would in this case have been impossible to have got the head in position to take off the foal. I once succeeded in taking off a foal by the fore-leg, with the head back. It was a large roomy mare. By the steady pulling of four men, I took off the foal. The mare did well, but the foal was dead.

*Detachment of the Perforans Tendon from the Pedal Bones, with Fracture of Navicular Bones in a Mare.* Being Remarks on Pathological Specimens received from Mr WILLIAM ROBERTSON of Kelso, one of the Members of the Scottish Board of Examiners. By Professor GAMGEE, Sen., New Veterinary College, Edinburgh.

WE are indebted for the opportunity of laying before the profession the details of one of the most extraordinary cases ever published, relative to foot pathology of the horse.

Mr Robertson has given the history of the case so clearly, that I shall pass on to describe the morbid specimens sent to the New Veterinary College on the 13th of March last.

In a note which came at same time, Mr Robertson briefly related the leading features of the case, sending us three feet of the mare, and one was retained and examined by himself, as will be seen by his report:—

“ KELSO, 10th June, 1863.

“ MY DEAR SIR,—According to promise, I ought to have communicated with you much earlier, relative to the history of the animal from which the morbid specimens I transmitted you were procured; but partly from oversight, partly from pressure of other matters, this has been neglected. She was an aged, very well-bred mare, had been put to the stud for several years, and, while able, employed at light work on the farm. With the exception of slight distention at the fetlocks of the fore extremities, she was remarkably free from disease or blemish, and had not for years been known to be lame.

“ While attending other cases about the middle of February, belonging to the same owner, I was requested to examine the old mare, as she had the day previous become very lame. On examination, there was detected considerable heat and tenderness in the region of the sessamoid bones and pastern joint, for which I ordered perfect rest, turning the mare into a loose box, and cold water bandaging to the articulation. About a week afterwards the mare appearing much better, the bandaging was ordered to be removed, the animal retained in the box, and the shoe which had been removed replaced. I heard nothing of the case until the 5th of March, when, in being hastily summoned to see the same animal, I was somewhat astonished to find her lying in a shed, perfectly unable to rise.

“ Knowing that she was nearly arrived at her full period of gestation, and observing blood on the straw, I at once imagined that abortion, or rather parturition, was about to take place. However, on looking more carefully at the animal, I observed a strange-looking wound in the hollow of one fetlock, which, along with another extremity, was being moved in a manner indicative of fracture of bone, or rupture of ligamentous structures. On manipulation, indication was afforded of the existence of both. It is no use me remarking on



the nature of these morbid lesions. Of course, from the specimens forwarded, you are in a better position to understand these than any one else.

"On inquiry relative to the termination of this case, I was informed that, being to appearance much better, the mare, contrary to my instructions, was walked to the smithy, about three hundred yards off, for the purpose of having the shoe affixed; this was performed easily enough, and then led homewards. When about twenty yards from the forge, she staggered, fell, and was never afterwards able to rise. She was conveyed to the straw-yard, where I saw her on a ledge or drag.

"These I think are about the principal particulars relative to the history of this rather remarkable case. Should there be aught else you may wish to know, I shall be happy to communicate with you, as I knew the mare for many years previous to this accident. The extremity I kept has much the same appearances as those in your possession.—I am, &c.,

"W. ROBERTSON."

The pathological specimens received from Mr Robertson on the 13th of March, consisted of the off fore and both hind feet of the mare whose case forms the subject of this communication.

The three feet were in a fresh state, the hoofs presented no abnormal appearance calling for remark; the mare seems to have been constantly shod, and judging from the way that operation had been done recently, I considered the shoeing to have been quite up to average work, leaving nothing on that part to which the altered structure could be attributed.

The off hind-foot had an open wound in the hollow of the pastern, at the bottom, just above the inner half of the frog, penetrating downwards within the lateral cartilage. This, on inspection, was shown to be a torn wound, effected through the upward actions, and it was easily seen that it led to lacerations of an extraordinary character.

The feet exhibited one appearance in common, a fulness in the hollow of the heel, which arose, as could be felt, by structures removed from their normal position being drawn up there; they also showed a fulness caused by the whole cellular tissue being engorged with extravasated blood.

At this stage of the investigation, I decided, instead of mutilating the specimens by getting off the hoofs at once, to place the feet, in the state in which they came, into the macerating tub, where they were kept until decomposition had sufficiently advanced to admit the hoofs being slipped off easily, exposing all, in the best possible state, to be seen—both of the inner surface of the hoofs, and the outer surfaces of the attaching structures.

Although the water had been changed almost daily during the first fifteen out of the thirty days which the feet had been in maceration, on removal of the hoof, and cutting through the skin, the structures had the appearance of a mass of coagulated black blood.

The first lesion to be noticed before the scalpel was used, was in one foot a transverse tear of the fibrous sole of about two inches in length, corresponding in position to the point of the frog, and extending in equal distance each way laterally, forming with the frog the shape of the letter T. This torn aperture exposed the pedal bone, and showed that the flexor tendon was detached from its position, as subsequent further explorations proved to be the case, through its whole extent.

Though this laceration of sole was more extensive and marked in one of the feet, there were traces of similar injury in all three, which, though not extending through the outermost layers of structure, could be traced by the feel. I then removed the skin of all the specimens, exploring each in turn by degrees, and though the quantity of blood led me to determine not to do too much before further maceration and washing enabled me to see the structures better; still, the main features of the case were discernible at once.

The navicular bones of both hind feet were fractured; that of the off was divided into three pieces, both ends being completely separated from the centre, and these severally were drawn up into the hollow of the heel, as alluded to. The navicular bone of the other hind foot was fractured, about one-third from the extremity on the outside; the detached end was drawn up with ligaments and cartilages, as in the first one described. The cartilages were wholly torn asunder from the pedal bone on the inside of the off hind foot, and particularly so on the outside also. The common ligaments of the joints were broken up in both hind feet, but especially in the off, in an indescribable way, fragments only being traceable, with specula of bone adhering. The broad expanded ends of the perforans tendons were mostly whole, and had adhering to them irregular layers of the pedal bones, which consisted of the semilunar crust, having become so much weakened by the altered texture of that bone, as not to have maintained sufficient strength to retain position.

The above expresses all that I can say most worthy of notice with regard to the two hind feet at this stage of examination.

The fore foot exhibited the above lesions in kind, except that the navicular bone is entire and has retained its position, the perforans tendon having given way from the pedal bone, as in the other two cases, was drawn back, the pedal cartilage on the outside was torn by the action of the ligament which attached that structure to the navicular and pedal bones, and which, by its connection with the pastern bone, acts on these.

Having during the next few days, whilst keeping the specimens in water, frequently changed, succeeded in removing the accumulated blood, so as to be able to see the parts better, I passed each foot again through my hands, and removed as much of the connecting tissue as was necessary to a better view of the whole; the chief incidents observable in several examinations subsequent to the first and chief one, was the state of the pedal bones of all the three feet;



there was evidence of much alteration in texture, and that sufficient strength was wanting to bear the exertion of the tendons and ligaments on them; and so much was this state evident, that the fibrous sole of each foot could be raised from its position; not as in ordinary cases, after long maceration, by detaching it from the smooth surface of the pedal bone; but in these cases, a layer of the bone was found adherent to the fibrous sole, leaving beneath a loose texture of bone.

The bone adherent to the sole consisted of the stronger layer of the pedal bone, which I have shown elsewhere in its normal condition, constitutes its main strength; and the strong crest which, in the normal state, gives support to the expanded end of the flexor tendon, had in this case given way from the body of the bone.

Wishing to learn some further particulars on the state of the fore foot which remained in Mr Robertson's possession, I wrote him, and received by return of post these replies:—

“KELSO, 13th June, 1863.

“MY DEAR SIR,—Allow me to answer your queries as they occur. 1st. The navicular bone is not fractured. 2nd. The tendon is very nearly completely torn from its attachment to the pedal bone. 3rd. The cartilages are not much lacerated in connection with the pedal bone.

“In addition to these there is, First, Rupture of the superior attachment of the middle or V-shaped inferior sessamoid ligament, which has adhering, portions of both sessamoid bones. Second, Rupture of the superficial or straight inferior sessamoid ligament, at its inferior attachment, or, more properly, it may be said, fracture of the supero-posterior portion of the os coronæ, to which this portion of the ligament is attached.

“The ligaments, although evidently undergoing some change, appear still to have been possessed of greater resisting power than the bones to which they were attached, as in every instance they have adhering to their ruptured extremities considerable portions of these bones.—I am, &c.,

WM. ROBERTSON.

“JOS. GAMGEE, Esq.

“P.S.—The cartilage of encrustation in all the articulations gives evidence of disease; you may call it ulceration if you choose; it is certainly removal of material, with marked discoloration.—W. R.”

*Remarks.*—No case of pathological anatomy ever afforded me so much material for reflection as that of the mare under consideration. The case is the more interesting, because it stands without an example on record in the history of veterinary literature, and yet actually to myself as a rather unexampled one for degree than character. Looking to the facts, we learn that this aged brood mare was brought under Mr Robertson's notice as being lame, on one foot chiefly, about the middle of February; she then became somewhat relieved under care-

ful treatment. The mare, some fifteen days after she was first seen by Mr Robertson, after being led a short distance to have a shoe put on, fell, and was never able to rise again.

How is the suddenness of this destruction of parts, fracture of two of the navicular bones, and laceration of the principal tendon from its insertion in all the feet, and the prostration of the animal, to be accounted for?

I believe that the near fore foot, which Mr Robertson kept, was the one first affected. I regard the condition of the pastern joint, and the pathological state of the seshamoid bones of that foot, taken with the appearances of those in my possession, to warrant this conclusion. Whilst, however, the near fore foot first gave way, through its having been the seat of old injury, as the thickened pastern joint showed, all the other feet had been undergoing change in their structures for a long time. And I think that the ultimate result is accountable for in this way, not presuming to say what was the extent of recent derangement when the mare was found lame in February, from which she to some extent recovered. I believe, however, that none of the extensive lacerations and displacements, which were shown after death, had occurred when the mare was under treatment in February.

The most probable order in which these ruptures and fractures occurred, that I can conceive, is as follows:—In an advanced stage of disease of the pedal bones of all four feet, the near fore being affected with most complications, on walking from the forge, the flexor tendon gave way from its attachment with the coffin bone of that foot, and instantaneous rupture of the same structure in the opposite fore foot would follow; whilst, in convulsive agony, both hind feet would be plunged under the body, to relieve the fore, when their tendons would give way also, and, by the position and stress assumed, the navicular bones were receiving a stress they could not bear; and, by the action of these pastern pedal ligaments, the functions of which were first pointed out by myself, in a paper in this *Review*, these ligaments acting, as I described their functions under leverage power on the navicular bone, snapped that structure asunder.

All that we see did happen, could take place by the convulsive efforts of an instant. I am the more persuaded that the near fore foot first gave way, by the fact of the off hind being the most of all smashed up.

The above case is one of the most instructive on, or rather confirmative of, my views on the physiology of action, of any single case that ever came under my notice; more than one case which I have seen within the past year, might be brought in with this, and one would help to throw light on the other; to go into the details of these now would extend this report beyond our present limits, so that I must conclude my remarks; and attention will again be drawn to the subject, when the report of the analysis of the diseased bones is ready.



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### THE VETERINARY CERTIFICATE OF THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

It is a wholesome rule, that business men adhere to very generally in this country, not to interfere in matters which they do not thoroughly understand. Circumstances occasionally force deviation from this laudable practice, and the result then is, that a good cause is seriously damaged. Our readers will observe, from the report of speeches by Sir John M'Neill, Mr Maclagan of Pumpherston, and Sir John Stuart Forbes, that, thanks to the gratuitous services of an indefinite number of medical gentlemen, the students of the Clyde Street College were recently examined and awarded the Highland Society's certificate, whereupon Mr Maclagan alluded to the 1700 gentlemen, including amateurs and farmers, as well as *bona fide* veterinary students, who had studied at the Clyde Street College, and of these 740 had obtained diplomas. Mr Maclagan went on to show the high position held by these 740 gentlemen, not knowing, perhaps, that throughout Her Majesty's dominions, including the army, there are not at present 300 individuals practising as veterinary surgeons holding only the Highland Society's certificate. The army list of members of the Edinburgh Veterinary College does not amount to 20, and every year we have gentlemen who formerly took the Society's certificate qualifying themselves as veterinary surgeons by becoming members of the Royal College. Why must Mr Maclagan, and others, persist in regarding the Royal College of Veterinary Surgeons as a London institution? and why do they persist in confounding it with the Royal Veterinary College at St Pancras? But for the Highland Society supporting a Board that has no legal right to award veterinary diplomas, we should not find a small section of men that have studied in Edinburgh placed in the awkward position of practising the veterinary art and illegally calling themselves veterinary surgeons.

It is supposed by some that the Highland Society's certificate answers in Scotland, whereas 50 per cent. of the Scotch students are

not content with that certificate, and much the larger number of veterinary practitioners in Scotland are members of the Royal College of Veterinary Surgeons. The Board of Examiners in Scotland is quite independent, and all who wish may receive satisfactory information on this point from Dr Struthers. Professor Miller is its chairman; and of the three English members of the Board, two recently seceded from the Highland Society's Board, both being old pupils of the Clyde Street College, and both anxious to see the pupils of that College legally qualified to practise the veterinary art.

Although it has been asserted very frequently of late, that a motion would be brought forward at the June meeting of the Highland and Agricultural Society of Scotland, to ensure that an annual sum should be voted for this purpose, no person rose to propose it on the 24th ult. As the Directors are to take the subject of veterinary certificates into consideration, we hope they will not attempt to use any influence which will tend further to split up a small and useful profession, but that they will rather advise the consolidation of the whole.

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## MEETINGS OF SOCIETIES.

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### *HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.*

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#### VETERINARY COLLEGE.

At the half-yearly meeting of the above Society, held on 24th June,—Captain Hunter of Thurston in the chair,—the following discussion took place:—

Sir JOHN M'NEILL reported that the Veterinary College continues to maintain its name, and to attract an increased attendance from all parts of the empire. The directors have, on behalf of the Society, to acknowledge the valuable assistance gratuitously given by the most distinguished members of the faculty of medicine in Edinburgh, and by the eminent veterinary practitioners who have jointly conducted the annual examination of the College, and whose names afford an ample guarantee for the sufficiency of the test applied, and for the qualifications of the gentleman who had received the diploma. He had only to add that, in the absence of Professor Goodsir, the examinations of last year were superintended by Dr Craigie, President of the Royal College of Physicians; and it must be very gratifying for the Society to know that such an important institution continues to prosper and give satisfaction to the public. (Applause.)

Mr M'LAGAN, Pumpherston, called the attention of the meeting to the following statement in the report of the Royal Agricultural Society of England, in reference to their Veterinary Department:—The governors would call attention to the completion and publication of a new register of the qualified members of the profession, by which agriculturists will be enabled at once to ascertain whether those who call themselves veterinary surgeons in their respective neighbourhoods are in reality scientifically educated practitioners. Many persons who can lay no legal claim to the title still continue thus to designate themselves. This is a subject of some importance to the agricultural community, as it appears from a



statistical return which has just been obtained by the Royal College of Veterinary Surgeons, that while there are 914 members of the College settled in practice within the United Kingdom, there are no less than 1244 individuals who assume the name of veterinary surgeon, besides 1189 farriers. Thus it is seen that much still remains to be done by the united efforts of the Royal Agricultural Society and the Royal Veterinary College. The Governors trust that they have adduced sufficient evidence in this report of their determination to fulfil the conditions of their alliance with the Royal Society in their full integrity. They consider the interests of the agricultural community to be most identified with their own; they require only the cordial co-operation of agriculturists in their efforts to improve the veterinary art in its application to cattle, sheep, and pigs. No means which are at their disposal have been spared to accomplish this improvement. They have especially sought to give practical effect to the provisions of the Society's charter by engrafting sound principles of medical science upon the minds of their pupils, the future members of the profession. They were aware that it was not necessary that those gentlemen who received the veterinary diplomas of this Society should become members of the Veterinary College of London, but the inference which he drew from this statement was that gentlemen who were not members of that College were not to be considered as duly qualified, scientifically educated practitioners—in other words, that they were to be considered as empirics and quacks. Now, as half the gentlemen who received the diploma of this Society were practitioners in England they must come under this ban, and he thought it right that this Society should take some steps, in justice to those gentlemen, to undo the impression which might have been raised in the minds of English farmers by such a statement as this, emanating from the Royal Agricultural Society of England. The value of the Edinburgh College would be appreciated when he mentioned that no fewer than 1700 gentlemen were educated at the Edinburgh College, and 740 received diplomas there; and the value of its diploma was enhanced when he mentioned that it was received at the Horse Guards in London, and that the gentleman holding the highest place in the veterinary staff in India was a member of this Society, and had not the diploma of the Royal Veterinary College of England. He was quite sure that when the members of this Society heard what he had stated, they would take some steps to have the names of the gentlemen who received the diploma of the Edinburgh College brought before the public. He ventured to throw out the recommendation that as the English Society had made up a register of the gentlemen who received diplomas from the Royal College of England, a similar register should be made up of those who passed the Edinburgh College. He suggested that such a register should be made up and published in the "Transactions of this Society," and that every step be taken to circulate the register as widely as possible. (Cheers.)

Sir JOHN M'NEILL thought they were greatly indebted to Mr M'Lagan for his attention to the interests of the Veterinary College. He thought this proposal was unexceptionable, and he would even venture to go a step farther, and suggest whether the directors should not put themselves in communication with the directors of the Society in London, in order to obtain a mutual recognition of diplomas by both Societies. (Applause.)

Sir JOHN STUART FORBES agreed with Mr M'Lagan that it would be a desirable thing to have the names published, but the terms of the charter of the English College undoubtedly declared that none but *alumni* of its education should be legally considered veterinary practitioners. It was entirely on the legal point that the question between the two diplomas stood. He agreed with Mr M'Lagan that it would be desirable that the matter should be properly understood, and that the Society should take such steps as they considered proper to vindicate the legal rights of those educated under its auspices; but he believed that investigation would prove that the position laid down in the article which Mr M'Lagan had quoted was the legal and correct one.

The CHAIRMAN stated that the directors would take the matter under their consideration as soon as they had an opportunity. (Hear.)



## ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

### BREEDING AND FEEDING OF SHEEP.

(From the *Weekly Agricultural Review*.)

At the weekly meeting of the Council and members of the above Society, held on Wednesday the 10th June,—Lord Berners in the chair,—Professor Coleman read a lecture

“ON THE BREEDING AND FEEDING OF SHEEP, WITH A VIEW OF INCREASING THE SHEEP STOCK PER ACRE.”

Having pointed out the importance of the subject as only second to that which had recently occupied the attention of the Society—viz., Steam Cultivation—and shown that the native production of sheep had not kept pace with the increase of population, whilst according to the Board of Trade returns the foreign importations had steadily fallen off during the past three years, he observed that the British Isles were naturally adapted to the growth of meat; and the question was, how we could best make use of our advantages and adapt our system to the conditions by which we were surrounded. The point he would suggest for consideration was a more economical system of feeding sheep, especially breeding sheep, so as to increase the return, and at the same time leave the land in a better condition for corn; and this, he believed, would be effected by reducing the quantity of roots and using more dry food in the form of straw, combining with this a small quantity of artificial food, which would act as a stimulus to digestion. By adopting that system the land would be left in a richer state for corn, because the sheep would take a longer time to consume a certain weight of roots, and be healthier than when eating as many turnips as they could consume with little or no dry food. Turnips during winter were very little above freezing point, and it followed that much heat would be absorbed, and consequently food wasted, in raising the large volume of water they contained, 90 per cent., to the temperature of the animal's body. Water within, and often water without, the temperature of the body must be greatly reduced, and it was not to be wondered at if, with such an unscientific mode of feeding, the animal could not maintain its condition, and was unable to minister to the wants of the foetus. The latter was often chilled, and dead lambs were the result, especially with young ewes in a wet season. If, then, they could by any means reduce the quantity of roots one-half, and substitute an equivalent in the form of straw and condimental food, at the same time attending to the external comfort of the animals, they would have achieved a great success, the land would be doubly manured, straw would be made more of than when trodden solely into manure, and a greatly increased number of sheep could be kept upon a given weight of roots.

With regard to the feeding value of straw, there was abundant evidence to show that, when cut green and carefully managed, many kinds of straw were exceedingly nutritious; and from personal experience he was convinced that good straw might be economically substituted for hay, in the winter feeding of breeding sheep, even without any artificial food. The reduction of one-half the usual supply of roots, and the substitution of straw, &c., would be compensated for by the healthier condition of the sheep in eating so large a proportion of dry food; less fuel would be required to maintain the heat of the body, because less water would have to be heated. Scouring, which in bad weather was common to ewes eating only turnips, was rarely seen when straw was consumed; and with such feeding the sheep might be kept up to or near lambing time in a healthy thriving state. The addition of a very small quantity of artificial food would prove a good investment both as regarded the land and the animal, enriching the land to some extent, but acting principally as a stimulus to the digestive powers of the animal. The cost per head would be very small. Thus, 100 sheep eating off 15 tons of turnips would take thirty-three days, and if supplied with  $\frac{1}{4}$  lb. per day,



each of artificial food would eat 825 lb. The food would cost probably about L.8 a ton, and might be composed of equal parts of rape-cake or oatmeal, beans, pease, or lentils, and Indian corn; to which might be added 9 lb. of fenugreek and 6 lb. of aniseed. The cost per head for six months would be about 3s. 3d.; of which one-third would be returned in increased wool, one-third left as manure, and one-third paid for in the improved condition of ewe lambs. As to the method of using straw, supplying it long, in racks, was preferable to giving it in the shape of chaff. Indeed, nothing could answer better, unless it could be shown that a system of pulping roots and cutting chaff could be economically carried out. The order of using straw should be as follows:—Good sweet barley straw first. This might be commenced when the ewes were eating mangel tops, &c., and would do till November. Then oat or bean straw, the latter most valuable in cold weather, and lastly pea straw, which, when well made, was equal to much of the seed they made on light land; and this might be given with a portion of hay when ewes were lambing. The practice at the College Farm was to build a good stack of freshly-threshed pea straw in the ewe pen, often forming a wall of division, and fodder once a week with this, and once with hay. Sheep thus fed would be most conveniently managed with nets instead of hurdles, as there was less work in setting a fold, and the turnips should be first picked up at a cost of 1s. 6d. an acre. He was satisfied that pulping the roots and mixing with straw chaff might be economically carried out; and there was no doubt whatever that breeding sheep would readily eat food so prepared, and thrive much better upon such a mixture than upon roots alone.

For their consideration he sketched out the following plan:—The corn stacked in a convenient position, thrashed, and straw carefully stacked and thatched. Roots cleaned in large heaps, and at such distances apart as would allow of the sheep lying two days on the same ground; using a combined pulper and chaff-cutter on wheels and worked by one-horse gear. A light, roomy house on wheels, with canvas sides, to store mixture for use on the second day. Four days a week one horse and lad employed extra. A load of straw first carted from stack to heap of roots, then the two cut up; produce of the morning's work used for the day's food; that cut later in the day stored away in the house for the following day. This scheme, however, would do best on dry healthy land. Before the ewes went to the lambing pen they should be dressed with a solution to destroy lice and ticks. This prevented the rubbing which was also so common. The best plan was to have a double line of hurdles set up at 4 feet apart, suppose about 8 to 10 hurdles long; at each end more hurdles at right angles, so as to form entrance and exit places. The ewes drew in and stood together so closely that they were easily handled by the attendants, three in number. One held the sheep, another attended to the liquid, and delivered it to the third, who, with an old teapot or similar vessel with a spout, poured the solution along the back from head to rump three times backwards and forwards, one pint of liquid to each sheep. The quieter ewes could be kept during all stages of pregnancy the better.

In breeding it was always desirable to use first-class sheep. The males should be of a higher quality than the females; but more especially was it necessary to select the very best animals to put on young ewes; for the character given to the first produce would often come out again. Young vigorous rams would get the larger part of the stock males. Doubles depended very much upon the condition of the ewes. If ewes were poor and doing badly doubles would be scarce; if in good hard condition, and rather improving, more doubles might be expected. The nature of the farm as affecting the quality of the food had also a good deal to do with this. The plan of marking the breast of the ram with ruddle was convenient, enabling them, by alteration of the mark after three weeks, to draw out the forwardest ewes from the pen; and where a convenient washpool existed on the farm it would be found desirable to swim the ewes occasionally, though, of course, unless great care was exercised, this might be attended with risk when they were in year. In the case of fevers, especially when they resulted from hard keeping, swimming would prove most advantageous



From eight to ten days should always elapse between washing and shearing, in order that the yoke might rise. The ewes after lambing continued on turnips or swedes. Good crops of the former might be obtained on early vetches. At this time the proportion of dry food must be lessened, and a few mangels introduced. Lambs soon learn to run through lamb hurdles, and might have a fold ahead, being supplied with a small quantity of artificial food, consisting of pounded linseed-cake, bruised oats, pot bran, and malt coombs in equal proportions. The quantity consumed would be very small, and the great object was to teach them to eat, so that when there was a change of food, and better treatment was required, no time should be lost. The management of the young lamb for the first five or six months was the most difficult. They were very susceptible to unfavourable circumstances, and bad food for two or three days only would often permanently check their progress. Lands must never "lie back," as the young shoot of clover or ryegrass was sure to produce scour from its unripe state.

If by the use of straw, either pulped or long, they could increase their winter keep, as he believed they could to a large extent, they would want both swedes and vetches to carry them alone through spring and summer. Early weaning would be found generally desirable towards the middle or the third week of May. Lambs dropped in February would do best without their mothers. As soon as possible after weaning they should be carefully dipped. Bigg's dipping trough and composition were both excellent. They should dip twice or thrice during the season; and the outlay would be well repaid in improved health, freedom from irritation, &c. Change of food was desirable for lambs. Hence vetches and clover could be alternately fed. Rape and vetches mixed, and then rape, which might be got for August, early turnips and rape in September, and sainfoin was very valuable also as a change. On regular breeding farms, especially when the climate was against winter feeding, lambs should be sold in the autumn. They would often make a comparatively higher price than if kept through winter and fattened. There would always be plenty of buyers, because so many farms were unsuitable for breeding. It was probable, also, that fattening sheep in yards would be more common when the profitable character of the system as compared with feeding cattle had been more fully demonstrated. Hence they might look for an increased demand for good stock tegs.

Lambs when first put on to roots were sometimes affected with scour of a peculiar character, and died off very suddenly. In these cases the roots were generally very fleshy and growing. The sheep had abundance, and were probably poor when put on, and appeared to be doing remarkably well. The cause of death was apoplexy, or making blood too fast. The blood became thick and unhealthy, and the animal died. Corn given injudiciously would produce the same result. If the sheep were supplied with corn unduluted with chaff early in the morning, when the belly was empty, they would eat ravenously, and suffered accordingly. Chaff as a diluter of corn was so valuable that some old shepherds considered a pint of corn to a pint of chaff equal to one quart of corn alone. Chaff with roots, if the application could be economically carried out, would be undoubtedly far better food, especially during the depth of winter, than so very large a quantity of roots.

LORD BERNERS—I am sure that the meeting will be of opinion that most of the suggestions that we have heard from the Professor are of the highest value. Speaking from my own experience, I can state that I have for many years carried out what he has recommended with respect to dry food both for cattle and sheep. I have found that when I reduced the quantity of turnips given to bullocks and sheep, and supplied them with a certain proportion of cut straw, they have done a great deal better than they did before.

MR HOLLAND, M.P., had tried the mixture of chaff and cut hay with roots referred to by Mr Coleman, and had experienced all the economy in the consumption which that gentleman had mentioned.

SIR W. MILES, M.P., thanked the Professor for his admirable lecture, in which every flockmaster in the kingdom was more or less interested.

MR DENT, M.P., observed that, as the Professor's observations had treated



almost exclusively of sheep in the southern and south-western counties, he would take the liberty of making a few remarks with regard to the system of management in Yorkshire. In the north they did not get their lambs dropped until the latter part of March or beginning of April. Therefore, the weaning time this year was yet to come, and it was usually in July and August. Upon nearly all farms where there was old grass land, it was a rare thing to run the ewes in lamb upon turnip land; and, speaking from his own experience, he should say, as a rule, it was not a good thing. In fact, the winter before last his ewes had no turnips until after lambing; and, although his shepherd was exceedingly anxious they should have some, when the lambing came he was compelled to acknowledge that he had never known a healthier season. Last year they ran for the greatest part of the time upon old grass land, and had a few turnips carted to them, with a certain amount of corn and cake. There was great difficulty in managing a flock of ewes upon strong land. One or two years he had suffered very severely from scour in lambs, and that was always the result when by accident he was tempted to put them back in the clover field. During the two last seasons he had found that the best plan for keeping them free from scour and in a healthy condition was to place them upon old grass land which had not been stocked with sheep through the previous part of the year. From the old grass land he put them upon white mustard, either by itself or mixed with rape, a remarkably healthy crop for young lambs, which would eat the young mustard upon its coming into flower before they would touch the rape. He could not help thinking that the system of folding mentioned by the Professor must be a good one; but it was not carried out, that he was aware of, anywhere in the north. Some time ago, he read a paper by Mr Bond, of Suffolk, upon the management of breeding flocks of ewes upon strong land, which impressed him very much, and he thought it would be a good plan to follow it out in the north. The practice of folding in the summer was not known in Yorkshire. There, too, a hurdle was scarcely ever seen; and they suffered much from game. When nets were used they were bitten in holes by the hares. The sheep were therefore left to run over the seed field. He recollected once endeavouring to fold ewes and lambs in meshes; but two lambs got hung in the nets, and he had known a case or two of tegs or full-grown sheep hanging themselves in the same manner. It was important to know what could be substituted for clover in the case of a flock of breeding ewes. In the north great difficulty was experienced in growing clover once in four, or even in five or six years, and he should be glad to see his way to the adoption of some rotation, such as tares or vetches. The idea of vetches and rape together for feeding off seemed to be a very good one. In the East Riding it was a common practice to take a portion of land that ought to be in clover and sow it with vetches, eat it off early, and then take rape after the vetches. As to ewes producing pairs of lambs, he might mention an interesting fact. Last year he wanted some additional sheep, and purchased forty-five Leicester ewes of capital quality, and in excellent condition. After he had them he put them with his other ewes upon rape and white turnips, with the same rams; but out of the whole forty-five nearly thirty were barren; and he attributed this to the fact that he did not keep them so well as they had been kept by their former owner, and that consequently they had fallen off in condition when put to the ram. In this opinion he was confirmed by the fact that the great proportion of the remaining or ninety ewes bore double and treble lambs from the same rams. That appeared to corroborate the view of Professor Coleman, that the ewes should be in an improving condition when put to the rams.

Mr P. FRERE believed that malt chives given to the ewe flock would induce them to eat much more straw in mild seasons than they would otherwise be inclined to take. His practice was from the first to give his lambs all the appropriate artificial food that they could be coaxed to eat; and when the rapid growth of the lamb was compared with that of the other breeds of animals, and the speed with which it attained the stature of its parent, was observed, he regarded it as particularly adapted to be fed well from the outset.



Lord BERNERS asked Mr Holland if he had ever used cocoa-nut netting for his folds.

Mr HOLLAND had done so, but had not given it a fair trial. He was quite satisfied with the trial he had given the common net.

Lord BERNERS had himself put down cocoa-nut netting, but found it eaten through by the sheep in innumerable holes in the morning.

Mr FISHER HOBBS said that the system which Professor Coleman had propounded coincided very closely with his own practice in the management of a Southdown flock. He believed it was a most profitable system upon the light lands in an open country. It enabled the farmer to produce mutton and lamb of early maturity, and the flock might be managed under it in a manner very superior to the system adopted in the northern and midland counties. Indeed, a flockmaster might keep from two to four sheep per acre, and if it were good grass land a certain number of beasts, and thereby make a better return than in any other way. In his district nothing paid so well as sheep feeding on a high system in the manner recommended by Mr Coleman. He should like to know, however, in what way the wash-pool was to be used. Of course, it could only be at a period of the year when the ewes were not in a state of gestation, and could only be required during the summer months. Swedes had been recommended after lambing time. But some years since a friend of his, Mr Edwards, of Sutton, Suffolk, who kept a large flock of sheep, having lost a great many lambs before they came to maturity owing to washing, wrote to him (Mr Hobbs) for advice. In answer, he put several questions to Mr Edwards, the first of which was—"Did you feed your ewes on swedes before lambing time?" to which inquiry Mr Edwards replied that he did, and that he had lost 100 lambs. The use of rape for lambs in the summer months was very important. Within the last fortnight he had lost 10 or 12 acres of coleseed entirely through the drought. The field had contained winter oats and vetches, and sheep and lambs had been feeding upon it with abundance of oil-cake; it was well ploughed, but when the coleseed came up, the recent excessive drought destroyed the whole piece. In his neighbourhood, especially on such land as he occupied, they depended much during July and August upon the early dwarf rape, which he believed was not commonly used. He had had his from Dorsetshire, and it had turned out to be of very great value. He sowed it 18 inches apart, and harrowed it frequently, and in eight or ten weeks it made the best and most fattening food for sheep that he had ever met with at that time of the year. In the present day, a joint of mutton was to be seen upon the table upon every public occasion; and it was necessary to encourage the breed of sheep even more than any other animal. It was unfortunate, however, that in the course of the last three years, as Mr Coleman had shown, the number of sheep in this country had greatly diminished, although the population had rapidly increased.

Mr HOLLAND—Mr Coleman had alluded to the dressing of sheep. Now, in Lincolnshire, there had been, he understood, a great mortality amongst sheep, owing to the attempt which had been made to cure the scab in particular by means of mercurial preparations which were generally used in the form of an ointment. This ointment had the effect of shutting up all the pores of the skin, but not until its mercurial properties had had an injurious influence. Scores of sheep had died from this cause, and after death it had been discovered that where the mercury had entered into the system the meat was bad for human food. It stood to reason, if the pores of the skin were stopped over the whole surface of the animal, that which ought to escape from the body, such as carbonic acid gas, would become mixed with the blood, and the whole system would be deranged. Not only that, but the organic particles which ought to escape from the animal, in order to its remaining in a perfect state of health, were retained and also driven into its system. Now this ought to be guarded against by farmers; and he was glad to hear from the Professor that the proper dressing ought to be in a liquid form, and not as an ointment. Analogous to filling up the pores of the skin of the grown-up animals with an ointment was that system which caused a great



mortality of lambs every year—namely, covering the lamb which had lost its dam with the skin of another lamb. In the same way this practice stopped up the pores of the skin, and produced a diseased and unhealthy animal, if not its loss by death.

After a few words from Mr BARKER,

Professor COLEMAN briefly replied: and, in allusion to the subject of nets, said they were not used on the College Farm, owing to the fact that much of the land there was exceedingly shallow, the soil being only three or four inches in depth, so that they could not keep up the nets with stakes. Nets, however, where they could be used, offered the great advantage of easy removal. Of course, the existence of game in large quantities would constitute a fatal objection. As to the size of the mesh, that might easily be altered. The sheep on the College Farm were principally Cotswolds, and they answered exceedingly well. There was some trouble at first, and care and patience were necessary, for the labourers were sometimes so prejudiced against any alteration—and farmers too, for that matter—that they would not give a new food or a new system a fair trial. With regard to the washpool, he did not think its use need be restricted in all cases to the summer. On the contrary, he was of opinion that ewes up to the period when they were half-gone in lamb might be washed in the winter.

The meeting then separated.

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## PERISCOPE.

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### ABSTRACT OF A PAPER ON ERECTION OF THE PENIS.

By PROFESSOR C. ECKHARD, of Giessen.

IN spite of the many researches made upon this subject since the revival of learning to the present time, its very nature is still unknown. In order to study the phenomena, it seems to me, above all things, necessary to find out in any animal the nerve which is immediately concerned in erection, for by a certain operation the physiologist is able to produce erection in an animal when he chooses. In a paper to be published shortly,<sup>1</sup> I have described the results of an investigation on this subject, but I propose now to give a short abstract of the conclusions. In the first part I have given an historical sketch of all the papers relating to the subject, from de Graaf and Swammerdam, to Kölliker and Kohlrausch. As this part is a mere historical one, I shall not refer further to it here. In the second part I acquaint the reader with the most essential facts regarding the structure of the penis of the dog, the animal on which I have exclusively operated. To understand the physiological experiments presently to be mentioned, it may suffice to refer the reader to the following data. The *corpus cavernosum urethræ* is especially developed, whereas the *corpora cavernosa penis* are merely rudimentary in this animal. The former consists of the trabecular tissue well known to descriptive anatomists. At the posterior part, the trabeculæ form, as in man, the *bulbus urethræ*, at the anterior part is a second bulb which projects into the glans. The veterinarians consider this second bulb as a part of the glans, but I think with no sufficient reason. I will not, however, enter now into further details, but will only remark, that the anterior bulb swells up when erection takes place, and that at the time of cohabitation it is introduced into the female parts, and by thus becoming still larger, it partly contributes to effect the long coitus which occurs in the dog. In the posterior bulb the trabeculæ are small and thin, in the anterior, they are broader.

The arteries are arranged as in man. Each *corpus cavernosum penis* receives its *arteria profunda*, and into the *corpus cavernosum urethræ* enter two *arteriæ bulbosæ* with the following peculiarities:—In the posterior bulb each artery gives origin to a certain number of small serpent-like branches which run through the whole thickness of the bulb, from the insertion of the urethra towards the outer

<sup>1</sup> See my contributions to "Anatomy and Physiology," vol. iii.



surface. The smallest twigs lie in the substance of the trabeculæ themselves. At present we need not study the more minute structure of all these parts, for our investigation is mainly of an experimental character, and may be understood without entering very minutely into anatomical details. In the middle of the corpus cavernosum, urethræ, and in the anterior bulb, the arterial twigs get much smaller and less abundant. From this we may conclude that most probably the two bulbs perform different functions.

As to the veins, the most important are as follows:—

1. The two *dorsal veins*. Passing under the symphysis they unite, and afterwards divide again, but into two veins of unequal size. The union of the dorsal veins is imbedded in the tendons of two small muscles described by Houston, and called by him the *compressores venæ dorsalis*.

2. The *venæ profundæ* and *bulbosæ*, which require no detailed description.

3. A vein coming from the glans penis and the preputium, which opens into the *vena epigastrica externa*.

There are on each side two nerves. The first is sufficiently known as the *nervus dorsalis*, the second requires a special description. In the dog this nerve comes from the ischiadic plexus, in which it can be traced back to the two or three first sacral nerves. Sometimes, although very seldom, this nerve is divided into two branches. It runs along the vessels destined for the bladder and prostate gland, and close to these parts it enters the hypogastric plexus. In my paper above referred to, I have given a sketch of its course. The hypogastric plexus gives off small twigs for the bladder, prostate, and the membranous part of the urethra. Those fibres which accompany the latter contain the fibres taking part in erection. These being the same fibres which coming from the ischiadic plexus entered the hypogastric plexus, as proved by physiological experiments. They are extremely fine, so that, till recently, I could only trace them to the bulbus urethræ, which they penetrate to reach the interior of the corpus cavernosum urethræ. The other constituent branches of the hypogastric plexus have nothing to do with erection.

I next proceed to describe my experiments. First, I have paid attention to the dorsal nerve. In one series of experiments I cut it, or rather I took out a short piece in order to prevent any regeneration. In all cases I observed no constant effect whatever. In a second series of experiments, in which artificial irritation of the peripheral part of the divided nerve was carried out, negative conclusions were alone arrived at.

Next, I took into consideration the second nerve before described. The mode of operation to get at the nerve conveniently for irritation I will not describe here, for in my paper I have given a sufficiently detailed account. The first experiment led to the observation, that this nerve presides over erection, for I had hardly commenced to irritate it when the corpus cavernosum urethræ began to fill with blood, and in a few moments the anterior bulb appeared as a large and very hard swelling. Many experiments executed in the same way produced the same effect. I have only to add, that if the animal be a young one (about three-quarters of a year or less), or be subjected to castration, erection presents itself in a less degree. Still it is observable, especially when castration was carried out in later years. I need scarcely say that in man erection takes place in eunuchs, for the 6th of Juvenal's Satires gives us sufficient proof of this fact. It may be interesting to mention the further observation, that when the nerve repeatedly mentioned is irritated, evacuation of the liquor prostaticus also takes place. Hence the fibres for erection and those concerned in the process of squeezing out the prostatic fluid are contained in the same peripheral nerve.

Thus we have succeeded in finding means to produce erection in an animal whenever we desire; ought we not, therefore, to be able to make out the very nature of the phenomenon in question? I confess there is still a question to solve, but I may describe in what erection mainly consists. The reader knows what different and often contradictory statements are made, by both ancient and modern physiologists upon this point. Some believe that during erection, more blood is introduced into the penis, whereas others are of opinion that the swelling is effected if the veins be partly closed in any way. We may decide between



these two hypotheses. I laid bare the pudic vein, where it passes the cavum rectoischadicum, and cut it at a point just beyond that where all the veins of the penis had joined it. Now, I measured the quantity of blood previous to erection and also during this state. In all cases I got a much larger quantity of blood at the time of irritation than in the common state of flaccidity of the penis.<sup>1</sup> In spite of this all parts of the penis were hard and large. From this observation it follows, that during erection a larger quantity of blood is effused into the trabecular tissue, and that the common reflux of the blood through the veins is by no means interfered with. *On the other hand it is accelerated.* The experiments are somewhat difficult. They require much time, and, most of all, patience. Happily we may substitute for them the following experiment, which, although not so conclusive, still shows the increased flow of blood into the veins. After having prepared the nerve for a successful irritation we pick out one of the dorsal veins and observe the jet of blood which issues from it; first, when no irritation is produced; and, secondly, when the nerve is irritated. Under these circumstances we observe, that in the former case only a slow flowing of blood is to be seen, whereas in the latter the vein discharges a considerable quantity of blood, quite like an artery.

I believe that the apparatus by which the great quantity of blood is poured into the penis is solely lodged in the posterior bulb of the *corpus cavernosum urethræ*, for when making openings in it in such a way that they lie in a straight line from behind forwards, during irritation we observe, first, a jet of blood from the opening most posterior; after a little while, in the second opening—and so on. From this we conclude that the effusion of blood does not take place in all parts at once. And as the interval of time between the appearance of the different jets is more considerable than it would be if these differences depended upon the propagation of the nervous irritation, the opinion that the abundant effusion of blood almost exclusively takes place in the posterior bulb, and from this distributes itself into the venous cells, progressing from the posterior to the anterior part, is justified.

I have not yet referred to the corpora cavernosa penis. Do they in the dog also participate in erection? They certainly do, but not until after the corpus cavernosum urethræ has begun to fill. To convince ourselves of this fact we make openings in those parts. When no irritation of the nerve takes place, only some few drops of blood, or none at all, appear in the wound; but as soon as irritation begins, first the corpus cavernosum urethræ commences to fill, and afterwards a jet of blood makes its appearance in the opening of the corpus cavernosum penis. But at present I know no means to decide whether the swelling of these parts is dependent on the erection of the corpus cavernosum urethræ, or if it possesses its own proper apparatus for erection.

Up to this point of the inquiry my opinion is founded on facts, and I should like to stop here, but the mind is enticed to propose further questions as soon as one is solved. Thus I ask further, in which way or by what means the effusion of blood in the penis is produced. Two hypotheses present themselves. First, we may assume that by any muscular arrangement the area of the arteries is increased when the nerves are irritated, and that in consequence of it the flow of blood is free from the resistance the smaller area naturally imposes. Kölliker and Kohlrausch incline to this view; but I have reason to object to some points in their conclusions. Kölliker considers erection as a kind of motion quite analogous to the movements of the heart, assuming that the muscular fibres in the walls of the venous cells and the smaller arteries are continually in a contracted state, produced by nerve fibres taking their origin from sympathetic ganglia, and that at the time of erection the effects of the ganglia become annihilated by the action of the spinal fibres, in consequence of which the area of the before-mentioned vessels becomes increased. But it seems very strange that during the long periods in which no erection occurs as in children, old men, &c., neither the muscular fibres nor the nervous system should become fatigued! This objec-

<sup>1</sup> When irritating only one nerve upon one side, it amounted to four times the quantity I obtained in the ordinary state. In other cases I got much more.



tion does not apply to the heart, the contraction and dilatation of which alternate regularly. If in erection there be any active distension of the vessels, it must be effected in some other way. The second hypothesis consists in the belief that there might be (under the influence of the nervous system) any molecular alteration in the walls of the vessels, especially the veins, in consequence of which they may become softened, and may lose a portion of their rigidity, so that they may be more easily distended by the pressure of the blood. I prefer, however, to leave this question for the present, in the hope that it may be cleared up by further investigations.

## ON THE "LAMB DISEASE," OF WHICH PARASITES IN THE LUNGS ARE GENERALLY THE CAUSE, OR CONSEQUENCE.

By EDWARDS CRISP, M.D., F.Z.S., late Physician to the Metropolitan Dispensary.

PRIZE ESSAY.<sup>1</sup>

(From the Journal of the Bath and West of England Society.)

### Introduction.

IN this Essay my object will be to keep to practical facts and to avoid as much as possible the use of scientific terms, in the hope that my meaning may be plain and intelligible to all. I could fill pages with microscopical and pathological descriptions; but they would answer no useful purpose, but rather tend to divert from the main subject of the inquiry, namely, the disease, parasitic or otherwise, which is the cause of the death of so many thousands of lambs in this country.

I may premise that I have been for a long time investigating the diseases of the lower animals and of the vegetable kingdom, for the purpose of endeavouring to throw light upon human physiology and pathology; that vermiform diseases have especially occupied my attention; and that I possess a large *private* collection of entozoa from my own dissections made in this country. I have moreover for several years been studying the nature of the parasites which form the subject of this Essay, several of my agricultural connections having been great sufferers from the destruction of their lambs by parasites in the lungs and intestinal tube. Many of my researches and experiments have been made where the animals died; but a large number of lambs or parts of them have been sent to my own residence, where I have had an opportunity of making long and minute microscopical examinations of the various organs of the body. My Essay, therefore, will comply with that condition which requires it to be "*founded on experience and observation, and not in simple reference to books and other sources.*"

I purpose to divide my paper into two parts:—

Part I. will include:

1. A brief account of the bibliography and of the recent increase of the "lamb disease" in this country.
2. An epitome of the different orders of entozoa, and a description of their effects upon the health of various animals, so as to pave the way to the better understanding of the subject; and
3. Remarks on some peculiarities in the structure of ruminating animals, and on the proper mode of conducting *post-mortem* examinations.

Part II. will embrace:

1. An analysis of the answers to the questions addressed by the Bath and West of England Society to various agriculturists in the West of England.
2. An analysis of the information I have obtained from agriculturists, chiefly in the Eastern counties of England and from foreign sources, with remarks thereon.
3. The results of my own dissections and researches in lamb-disease, including an account of the pulmonary and gastric entozoa, with microscopic illustrations.

<sup>1</sup> To this Essay the prize of Thirty Pounds, offered by a Committee of Agriculturists in Cornwall, through the medium of the Bath and West of England Society, was awarded by LORD PORTMAN, the chosen adjudicator.



4. An inquiry whether parasites are the cause, or the consequence, of the disease?
5. Experiments respecting the transmission of these parasites to other animals, and on the preservation and vitality of their eggs.
6. The origin, effect, and treatment of worms in the lungs of lambs and in other parts.
7. A general summary of the evidence.

## PART I.

1. *Bibliography, and information respecting the recent increase of the "Lamb Disease" in this country.*

It is not my intention to refer the reader to all the works upon the entozoa, but rather to point to a few, wherein he can find information respecting the parasites which are the subject of this essay, and of others which affect our domestic animals.

It is difficult to ascertain by whom the *Strongyli* in the lungs of sheep were first described. Foreign writers—Italian, German, French, and Belgian—have paid much more attention to parasites of various kinds than has been done by English investigators; but I am not aware that any modern treatise on pulmonary parasites has been written in this or any other country. Scientific writers have accurately described some of the entozoa named in this work; but none of them appear to be aware of their destructive nature, and of the frequency of their occurrence, in lambs especially.

It is impossible to say when these parasites were first discovered; but it is quite certain that it is only of late years that they have become so destructive as to excite the notice of English agriculturists. To show how little has been known of this disease until recently, Youatt, in his excellent work on sheep, published in 1837, does not mention it; indeed, the only entozoa he speaks of, are the *Distoma hepaticum* (the fluke), p. 445, and the *Cœnurus cerebralis* (bladder worm). Mr Cleeve, in his prize essay "On the Diseases of Sheep" (*Journal of the Royal Agricultural Society*, vol. i., p. 295), does not mention the affection; and in a more recent prize essay "On the Sheep of the West of England," by Professor Tanner (*Bath and West of England Society's Journal*, vol. vii., p. 57), the disease is not alluded to. It is not necessary to wade through the various agricultural journals to find additional proof of my assertion, as the above evidence will, I think, suffice to show its correctness; neither do I at present inquire whether there is any mention of the "lamb disease" in old English authors and in others of a more recent date, such as Markham, Harrison, Mills, Young, Ellis, Blakewell, Ellison, Livingstone, Hogg, Culley, Price, Anderson, Laurence, Parkinson, Little, Marshall, Spooner, and others, all of whom have written on sheep. I presume that if these authors had noticed the disease it would not have escaped the observation of more recent writers. The same remark will apply to the *Strongyli* in the hog. These parasites appear likewise to have escaped observation, although, I believe, as I shall show hereafter, that they are fatal to a great many young pigs. The presence of these parasites in colts has not, that I am aware of, been mentioned by any writer, nor have I ever seen them in the air and intestinal tubes of colts. I have reason, however, to think, judging from the symptoms, which differed materially from those occasioned by the *bot* in the stomach, that some cart colts at Gedgrave, Suffolk, died last year from this cause.

Of the recent increase of these parasites in England, I think there can be but little doubt. One sheepowner (Mr Thomas Crisp) who has been acquainted with the same locality for forty years, and has constantly had a large number of sheep, tells me that he has only known the so-called lamb-disease for the last seven or eight years, and several other flockmasters make a similar statement.

Mr Watts, of Stroud, Gloucestershire, in a letter published several years ago, says: "I have occupied my farm for twenty years, and for the last four years I have lost nearly a third of my lambs—their lungs being full of blotches, in which were living creatures, like minute eels. . . . The lambs have been kept in the same way for twenty years on good grass."



Mr Bobby, Stutton, Suffolk, in a letter hereafter quoted, says: "I have lived in the neighbourhood seventeen years, and have heard of similar losses in lambs before that time, although so much attention was probably not paid to the cause as at present.

But the evidence of Baron Nathusius, of Hundisburg, Prussia, on this head, is especially instructive, namely, that in his neighbourhood, "more than twenty years ago, the disease was very prevalent, when lambs were less cared for; but since they have been housed and better fed, the fatality has nearly disappeared."

English writers upon these parasites, as far as I know, have given an anatomical description of the worm, but have said but little about its deleterious effects. Thus, Messrs Sandie and Padley have described the embryo state of the worm in the *Annals and Magazine of Natural History*, 1849 (vol. iv., p. 102), and Dr Radcliffe Hall has also written upon the subject (*Medico-Chirurgical Review*, vol. xvii., p. 449; but, as stated by Dr Ranke, neither of the above authors appear to have been acquainted with the farther development of the worm. In 1856 Dr Crisp<sup>1</sup> read a paper at the Zoological Society on the *Strongylus filaria* in the lungs of lambs and sheep, with suggestions for its destruction. Of this paper the following abstract is quoted from the Proceedings (part xxiv. 1856): "Dr Crisp exhibited specimens and drawings of *filariæ*, which had proved so destructive to lambs in various parts of England. In several lambs examined by Dr Crisp millions of these worms and their ova were found in the bronchial tubes and in the intestinal canal. These parasites, he believed, had often been mistaken for *cysticerci* (the cysts); but the various stages of development could be readily traced under the microscope. Dr Crisp had tried various experiments on the living worms, as to the effect of poisons and other agents, and he believed that salt or sulphur given with the food, and the careful inhalation of sulphurous gas, the most likely means of destroying the parasites." He had previously, in a letter to the editor of the *Mark Lane Express*, recommended the same remedy.

On the 3rd November, 1857, Dr H. Ranke read a memoir to the Pathological Society of London "On Pulmonary Entozoic Disease of Sheep" (see "Proceedings," vol. ix., p. 457). In this paper Dr Ranke has given a good description of the nodules in the lungs that have often been mistaken for tubercles, and has represented the worm in its various stages; but his figures of the tail of the embryo worm and that of the male do not exactly correspond with my own observation.

Among the foreign authors whom scientific readers may consult with advantage on the subject of these *filariæ* are Rudulphi, Bremser, Mehlis, Nordmann, Deising, Dujardin, Van Beneden, Küchenmeister, and Leukhart. Professor Hyrtl, of Vienna, in a recent communication to me, refers also to Seer, Kreutzer, Heering, Staubner, Spinola, and Roll, as containing information on the same subject. For present purposes, however, I must content myself with observing that Dujardin says (*Histoire Naturelle des Helminthes*, 1845, p. 123) that in the Vienna Museum these parasites (*Strongyli*) were found three times in 33 specimens of the common sheep, 1 in 25 in the Merino, 1 in 3 in the Cape sheep, 7 in 13 in the *Ovis Ammon*, once in another variety of sheep, once in a camel, and once in a dromedary. These worms are also stated to be very numerous in the goat, in which animal they sometimes occasion death.

As a matter of curious information I may add that parasites are said to have been first described by Florman, a professor at Lund.

## 2. *An Epitome of the different orders of Entozoa, and the effect of these parasites upon the health of various animals.*

I will now endeavour briefly to give the reader a general idea of the various forms of entozoa (worms) that are found in man and in the lower animals.<sup>2</sup>

<sup>1</sup> The author of the present Treatise.—ED.

<sup>2</sup> I could readily introduce the anatomy of the different kinds, and some of their transformations, but this would be foreign to the purport of my paper, which is to endeavour, in plain and simple language, to pave the way for the better understand-



Cuvier, following the classification of Rudolphi, divided the entozoa into two groups—(1), the *Nematoida*, which have an abdominal cavity with a mouth and anus; and (2), the *Parenchymata*, which have the viscera indistinct and embedded in a soft, pulpy, parenchymatous material—their organisation being of a lower grade than that of the first-named division.

The entozoa are divided into five orders—first, the *Cystica*, Cystic-worms (*κυστις*, a bladder), Acephalocysts; these bladders are very common in sheep, oxen, and pigs, and form the lowest grade of the entozoa. The second division, *Cestoidea*, *χέστ*, a band), embraces the tapeworms and their larval forms; the *Cysticerci*, including the *Cœnurus cerebralis*, the bladder-worm in the brain of sheep so well described by Professor Brown in the last number of the *Bath and West of England Society's Journal*, (vol. x., p. 273). The third order, *Trematoda* (*τρημα*, a hole), a division in which the Flukes (*Distomidæ*) form the main part. One species, *Distoma hepaticum*, so common in some localities in the livers of sheep, has been fully described by Professor Simonds (*Journal of the Royal Agricultural Society*, vol. xlix. p. 64), and by Professor Brown (*Journal of the Bath and West of England Society*, vol. ix., p. 347). The Spine-headed, *Acanthocephala* (*ακανθα*, spine), which constitute the fourth order, have long, round bodies, and a proboscis furnished with hooks which point backwards. The *Nematoida*, Thread-worms (*νημα*, a thread), form the last and most highly-organized order, and to this belongs the *Strongylus filaria Rudolphi*, the entozoon which will now especially engage our attention.

The first three orders are nearly all androgynous—that is, they possess both male and female organs of generation. In the last two orders the sexes are separate—the males being generally smaller than the females, and less numerous. In some the mouths are round and simple, in others tuberculated or furnished with suckers. Many species have hooks or hooklets by which they attach themselves to various parts. Some of the bladder-worms have three or four heads and necks from one cyst. The neck in some is very slender, and the head small; some—as the liver-fluke (*Distoma hepaticum*) have two suckers at the under and fore part of the body. The length of these parasites varies from the tenth of a line to 30 feet, and their weight and circumference differ greatly in the numerous species. One belonging to the same order as the *Strongylus* I am about to describe is as thick as the little finger, from 20 to 30 inches long, and it generally occupies the kidney in man, the horse, the dog, and the pig. It is called the *Giant Strongylus* (*S. Gigas*). Some of the encysted worms are of large size; that in the head of the sheep I have found to contain four ounces of serum, and in some of the acephalocysts in foreign pigs and ruminants, as also in the zebra, I have seen as much as 10 ounces of water. The ova of many of the entozoa, which by the aid of the microscope can be seen in their various stages of development, are very numerous. In bodies where a large number of the worms exist they may collectively be reckoned at many thousands.

The origin of these parasites is generally very obscure. Much light has been thrown upon this matter of late by the investigations of German and continental physiologists, but I do not subscribe to all their doctrines. The entozoa have been found in the *fœtus* in the womb, and it is not unlikely that the germs of some of the *Strongyli*, of which I am about to speak, may have been present in foetal lambs; but this matter yet requires much patient labour and research.

Some writers state that thirty species of entozoa are found in the body of man, but several of them are of very rare occurrence. To give the reader some notion of the prevalence of these parasites in the different classes of animals, I may mention that Deising, in his work before cited, gives 184 species of *Tænia*; *Strongylus*, 37; *Filaria*, 63; *Cysticercus*, 18. The flukes (*Distomidæ*) number between 300 and 400, and they are more frequently present in the intestinal tube than in the liver. To give the reader an idea of the number of the

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ing of the question under consideration, and to introduce such matters only as will be practical and useful. I refer those who require a more extended and a more scientific description, to the list of works at the end of the last chapter.



entozoa found in our domesticated animals, and in some of our British quadrupeds, the same authority (Deising) mentions 6 species in the mole, *T. Europæa*; shrew, *S. araneus*, 8; otter, *L. vulgaris*, 2; badger, *Meles taxus*, 6; polecat, *M. putorius*, 11; fox, *C. vulpes*, 15; dog, *C. familiaris*, 12; wild cat, *F. Catus*, 6; tame cat, *F. domesticus*, 7; mouse, *M. musculus*, 10; rat, *M. rattus*, 10; hog, *S. scrofa*, 19; horse, *E. caballus*, 20; goat, *Capra*, 16; ox, *B. taurus*, 19; and sheep, *O. aries*, 16. It is probable that many of these are only *varieties*, occasioned by change of habitat and other causes, as in animals of a higher order, many examples of which might be adduced.

I must confine my attention for the present, however, to nematoid worms, to which order those in the lungs of sheep belong. I have found several species or varieties of *filaria* in many animals, both British and foreign, that I have dissected. I have looked for them of late years especially in the foreign ruminants (deer, antelopes, goats, sheep, alpacas, and llamas); but only on one occasion—in the Audad (*O. tragelaphus*), North African sheep—have I found them in this class; a matter of great importance, when investigating the origin of these parasites, for the food of the animals named is generally *in a dry condition*. I have discovered specimens of *Filaria* and *Strongyli* in several of the carnivora, but always in small numbers, and not generally in the bronchial tubes. In the polecat (*M. putorius*), they were encysted in the lung substance. In one instance I found them in the kangaroo (*M. major*.) In a peregrine falcon (*F. peregrinus*), much diseased, they were present in two instances in the heart; and once I met with them in the knee joint of a bird. I have likewise discovered them in alligators, crocodiles, boas, and in many other reptiles. On one occasion I found a nematoid worm (*Spherularia vespæ*), two inches long in the body of a wasp (*Vespa vulgaris*),—a parasite, taking the weight of the insect into account, that formed a much larger proportion to the body than any other entozoon in any animal I have dissected.

As one of the leading points in this inquiry is, whether parasites in the lungs are the *cause* or *consequence* of the disease or diseases, of which so many thousands of lambs die annually in this country, it will be well at the outset briefly to consider the effects of parasites generally upon the health and longevity of man and of the lower animals.

In the human species in Europe death seldom results, directly or indirectly, from the presence or effects of entozoa. According to the Report of the Registrar-General, the deaths of very few persons are attributed to this cause. In some countries, as in Africa, the inhabitants are especially liable to internal parasites, and in many districts few persons are exempt; but we have no reliable information as to the effect of these parasites upon the duration of life. It must not be supposed that because an animal is affected with entozoa, it is necessarily in bad health, or suffers much inconvenience from them. In the intestines of a young shell duck (*A. tadorna*) that was accidentally suffocated under the ice, I recently found a great number of worms (*bothriocephali*), but the bird, notwithstanding, was very fat and heavy. If the lovers of salmon and cod fish could see the immense number of entozoa that are often present in the pyloric *cæca*, and in the intestines of some of the finest fish, their admiration and appetite would probably receive a simultaneous check. The bronchial tubes of the porpoise (*P. vulgaris*) are often crowded with nematoid worms: in the air tubes of one I recently dissected, I found a vast number of *Eustrongyli*, about 8 inches in length.<sup>1</sup> In pelicans, vultures, and other rapacious birds in confinement, the number of internal parasites is often enormous, but I have but rarely been able to trace death to their presence or effect. *If an animal be well fed, and not exposed to depressing causes, a large number of parasites may exist with apparent impunity.* But

<sup>1</sup> Some may express surprise that these parasites should be so plentiful in salt water; but this animal is a *quadruped* and not a *fish*, so that the water does not come in contact with the lungs. Many parasites are also found on the gills and scales of salt-water fishes, but on those fish that spawn in fresh water, as the salmon, *e.g.*, they soon die.



let me give a more forcible example, and one that can readily be tested and examined by most farmers. On a recent visit to the country (November) for the express purpose of investigating the Lamb disease, I examined (microscope by my side) 142 mice from a wheat-stack ; 115 rats killed in various parts of the farm ; and 21 rabbits killed on a sandy hill, with a wet marsh at the bottom. Of the rabbits, 15 had tapeworms (*Tænia pectinata*), in the small intestines, and all had *Strongyli* in the stomach. Of the 115 rats, 29 had tapeworms (*Tænia crassicollis*), in the small intestines, and six embryo tapeworms (*Cysticercus fasciolaris*) in the liver. Of the 142 corn-fed mice, three had tapeworms in the small intestines, and six had *Cysticercus fasciolaris* in the liver.<sup>1</sup> None of the above-named animals had parasites in their lungs ; yet all were from two farms where parasites in the lungs of lambs<sup>2</sup> are common, and all were in good condition : showing that parasites, if an animal be well fed, are not apparently prejudicial.

All young animals are subject to worms, especially in the alimentary tube. Children, as is well known, often suffer from the *Ascaris*, a small threadworm, that chiefly inhabits the rectum (the last bowel) ; and these parasites are occasionally expelled in very large numbers. The *Lumbricus*, a long white round worm, infesting the small intestines and occasionally the stomach, is sometimes very abundant, and many cases of fever and convulsions are recorded from the irritation supposed to have been produced by it. The tapeworm and other forms of entozoa are less frequent in children, and I am not acquainted with any recorded case of parasites in the lungs of a child. It is the young of our domesticated animals that are chiefly infested with worms ; the young of the sheep, cow, and pig, being especially subject to *Strongyli* in the lungs and air-passages. These animals, including others of the same class, are probably in a wild state affected with lung parasites, although of this we have no reliable evidence ; but the nature of the food of wild animals, and the greater range of country they possess, render it probable that these pulmonary entozoa are but rarely fatal to them. As has been already shown, many animals may have a vast number of internal parasites, and yet be apparently in good health. I have examined a great many of the young of our domestic animals, and of foreign animals in confinement, and in some I have found worms at a very early period, so as to lead to the inference that the germs of the parasites are transmitted from the mother. A pig a month old was sent to me some years since, the owner being desirous of knowing the cause of death, as he had lost many about the same age. In this pig I found one full-grown fluke (*Distoma hepaticum*) in the gall bladder, although the animal came from a district where the fluke in sheep is unknown, and had remained in the sty with its mother ; it might, however, have taken an embryo fluke (*cercaria*) in its food. At this time, though well acquainted with the *Strongyli* in the lungs of sheep, I did not know of their existence in the pig ; but judging from the symptoms and from the experience I have since obtained, I believe that all these pigs died from parasites in the lungs and air-tubes. In the kitten and in the puppy, three or four weeks after birth, I have found a large number of worms in the small intestines. The frequency of worms (*Syngamus trachealis*) in the trachea of young chickens, pheasants, and grouse, to be mentioned hereafter, has an important bearing upon this inquiry. In young missel-thrushes (*T. viscivorus*), blackbirds (*T. merula*), song-thrushes (*T. musicus*), and starlings (*S. vulgaris*), I have met with entozoa in the small intestines ; and when, in making a collection of British birds, I have reluctantly been compelled to kill old and young, I have found the same worms in both. In the examples of birds, the young may take the embryo parasites in the slugs, grubs, and caterpillars they are fed with ; but in the case of animals at the breast, it is more difficult to conceive that the

<sup>1</sup> It is a curious and interesting fact in connexion with the origin of the entozoa, that the London mice have *Cysticercus fasciolaris* in the liver, in the proportion of about one in three or four, and judging from about forty that I have examined.

<sup>2</sup> I did not examine the lungs of the hares and rabbits, but this will be an interesting investigation hereafter.



embryo could be received from without. Up to the present time I have been unable to discover any trace of parasites in the foetal lamb. I recently examined a foreign sheep, Aaudad (*O. tragelephas*), which died from inflamed lungs: she was about half gone with lamb, and had some *Strongyli* in the bronchial tubes, but I could detect nothing abnormal in the lambs. It is a matter, however, that requires a great deal of investigation,<sup>1</sup> and I hope ere long to speak with greater certainty about it. If it be true, as recently stated, in the *Mark Lane Express*, (April, 1862), by Mr Moren, of Cranbrook, Kent, that "a lamb three days old had 'plaice' in the liver," it goes far to show that the prevailing belief among scientific men that, the embryo (*cercaria*), of the fluke must pass into the body of another animal, such as the water-snail (*L. stagnalis*), before it can enter the stomach of the sheep, is not altogether correct: but there may have been some mistake on this head. It must be apparent, I think, that the above remarks are not irrelevant to the present inquiry.

The best example that can be given of the effect of worms in the air-tubes is that afforded by the very common and destructive parasite in the windpipe of chickens, pheasants, partridges, and grouse (*Strongylus trachealis*, Montague; *Syn-gamus trachealis*, Siebold). Thousands of young birds, as is well known, die from these worms, and I have had an opportunity of examining a great number of them. On p. 99 is a magnified sketch, which I have made of the trachea of a young pheasant filled with these monsters, which, besides depriving the part of its natural secretion, obstruct the passage of the air, and ultimately occasion suffocation. In this instance there cannot be a doubt, but the worms are the *cause* and not the *consequence* of the disease. As this treatise may be read by some game preservers, who lose many of their young tame pheasants from these worms, it will not be out of place to speak of two modes of treatment which are, as far as I know, exclusively my own, and have not before been made public. The first is to inject by means of a small syringe a small quantity of salt and water into the windpipe; and the second is to introduce into the windpipe a *very small* silver canula, having a stilette with a piece of sponge at the end. The canula is passed to the bottom of the trachea, the sponge is pushed out of the canula by means of the stilette; the canula is withdrawn, and the sponge is pulled up, bringing the worms before it. The opened and uncovered state of the glottis in the bird renders this plan easy of accomplishment. I have tried the injection of salt and water into the windpipe of a lamb, but the operation is difficult, and could not be *generally* practised. I may allude to one practical point that has an important bearing upon the subject of parasites in lambs. I examined in 1859, about twenty young pheasants, out of a large number that died from "Gapes;" they were reared under hens, upon ground that had been used for the same purpose for many years. On changing the locality and taking other precautions, the mortality has been comparatively slight. The young *wild* pheasants and partridges in this district that have a wider range, seldom die from parasites in the trachea. I may also mention in this place that the well known disease "Hove," or "Hoves" in young calves, is produced by the same species of worm as that in the sheep. I have a preparation consisting of thousands of *Strongyli* taken from the lungs of a single calf. In both animals the symptoms are similar, and the fact that a great number of calves die from these parasites, especially if they are turned out to grass, throws much light, I think, upon the origin of the disease, and serves to prove that these parasites are generally the cause of the fatality, and not the consequence.

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<sup>1</sup> Since this was written I have had an opportunity of examining three foetal lambs, in a flock that has suffered much for several years from lung parasites. One lamb weighed 10 oz.; the others about 4 oz. each. I examined them microscopically with great care, but could detect no germs of parasites in the lungs or in other parts. The time of birth, however, is the period when I purpose investigating this matter, but I do not expect to find evidence of parasitic contamination at birth; the mischief, I believe, is done at a later period.



It may be well to state before concluding this chapter, that I know of no example of the occurrence of *Strongyli* or *Filaria*, in the bronchial tubes of man. Deising, however, speaks of the *Filaria hominis bronchialis*, found in the bronchial glands of man, as mentioned by Rudolphi, Treubner, and Bremser. Again, Mr Rainy ('Pathological Society's Transactions,' vol. vi. p. 371) records an example of several small worms of a doubtful nature,  $\frac{1}{50}$  of an inch in length, which he found in the larynx of a woman after death. These may have been the embryos of some nematoid worm. The cases related by Mr Patterson in a subsequent part of this Essay require confirmation.

3. *On some Peculiarities in the Anatomy of Ruminating Animals in relation to this question, and on the proper mode of conducting Post-mortem Examinations.*

A very slight glance at some peculiarities in the stomach of ruminating animals will form, I think, an apt commencement to this chapter, for it is especially in animals of this class that these parasites in the lungs and stomach are generally found. It is true, as elsewhere stated, that the lungs of pigs are also liable to be infested with another species of *Strongylus*, but the presence of pulmonary worms in these animals is comparatively rare. The fact of the ruminants feeding close to the ground, and having no upper front-teeth, will serve, perhaps, to explain how readily these parasites and their ova are carried into the stomach with the food; whilst the after process of rumination, by which the food a second time passes the glottis (the opening to the windpipe), may have much to do with the ingress of some of these worms to the air-tubes. The sheep, goat, ox, and all ruminants have, as is well known, four stomachs. The first, the paunch (*rumen*), is five or six times the size of the three others, and its surface is covered with *villi*, so as to increase the superficies (the secreting and absorbing surfaces) to an enormous extent; this and the next small stomach, the honeycomb (*reticulum*), are chiefly concerned in the process of rumination. The food then passes through the manifold (*omasum*) into the last, or *digestive* stomach (*obomasum*), and it is in this viscus that the *Strongyli*, so generally present in the lamb-disease, are seated. But there is another matter connected with the stomach of the sheep, and with the physiology of digestion, that has an important relation to the disease in question. Whilst the lamb is sucking, and milk is its chief food, the paunch is comparatively small, and the fourth, or digestive stomach, is large. The early and sudden change in our domestic lambs from milk diet to vegetable food—often of an unhealthy quality—may have some influence in depressing the system and in preparing the way for the increase of these parasites. In addition to the great complexity of the gastric apparatus, we have in ruminants an alimentary canal of great length. The following is the measurement of three intestinal tubes of sheep that I have lately examined:—lamb, Southdown, 6 months old, 74 feet 9 inches; old ewe, Southdown, 109 feet 8 inches; old Leicester ram, 117 feet 8 inches, when the intestines are pulled out from the mesentery.

The lungs in the sheep present no important peculiarity. The air-tubes, which are lined with a delicate and highly sensitive mucous membrane, are very numerous. Thus in the main bronchial branches in the right lung I have counted 89 openings; in the left, 72, leading to smaller divisions and to the air-cells. It can readily be conceived by those possessing a moderate knowledge only of anatomy and physiology, that if these small tubes are blocked up—as they often are in lambs and calves—by masses of *Strongyli*, in addition to the irritation and nervous disturbance occasioned by these extraneous bodies, the important and life-sustaining processes of oxygenation of the blood, the maintenance of animal heat and of the process of sanguification, must be materially interfered with.

One great desideratum in this inquiry is a proper knowledge of the morbid lesions after death; and it is our want of this information, I believe, that has given rise to so much difference of opinion respecting the question "of parasites being the *cause* or *consequence* of lung-disease" (so called). I have reason to believe that the bodies of lambs examined by shepherds and persons un-



acquainted with anatomy, have been so superficially inspected, that very false and erroneous inferences have been come to; and it is on this account that I introduce some remarks upon the subject for the guidance of farmers and others when they are not assisted by a veterinary surgeon.

In examining the body of a sheep or of any other animal to ascertain the cause of death, it is necessary so to conduct the inspection that no part escapes investigation. It is to careless and superficial examinations, both in man and in the lower animals, that so many pathological errors may be traced. In all verminous diseases, accuracy of inspection is especially requisite, for it often happens, particularly in the disease in question (*Strongyli* in the lungs) that there is no sufficient amount of disorganisation in one particular organ to account for death; and it is only by carefully sifting and analysing the abnormal conditions, that a correct inference can be arrived at.

In sheep, the state of the wool and skin, the appearance of the eye and of the excrement, are matters first to be considered. The nasal sinuses, the condition of the blood, its proportion of red corpuscles, its tendency to coagulate, and its microscopic appearances, are not to be neglected. The various viscera—the heart, lungs, liver, spleen (milt), pancreas (lower sweetbread), and kidneys, must be carefully inspected. Next the whole track of the alimentary canal must be looked at;<sup>1</sup> the amount of distension of the paunch, the temperature of the contents, and the condition of the lining membrane should be especially noted, taking always into account the time of death and the state of the atmosphere. All parts should be closely inspected for worms. The *Strongyli* will be found in the lungs, stomach, and other parts of the intestinal tube; the tapeworms (*Tæniæ*) in the small intestines; the hair-headed worms (*Tricocephali*) in the *cæcum* (large intestine).

In old sheep the lungs and liver may be studded with bladder-worms (*Echinococci*), many of them in various stages of degeneration, from the cartilaginous to the cretaceous and bony. The gall-bladder and gall-ducts should be examined for flukes. The brain in young sheep may sometimes contain an incipient bladder-worm (*Cœnurus cerebralis*) when no symptoms have appeared to indicate its presence. The trachea and its bronchial ramifications must always be slit up with scissors, for it is almost impossible to tell by examination with the scalpel *only* whether parasites exist in the lungs or not, as they are not unfrequently confined almost exclusively to the smaller bronchial tubes.

Some may think that the above directions are unnecessarily minute, but it must be remembered, as I have mentioned before, that *Strongyli* and other species of worms may be very numerous, and yet the animal be apparently in good health; so that the inference that a sheep or any animal dies from worms, because they happen to be in great abundance, may be very erroneous. A combination of causes may be present, and it is necessary in all cases to balance and sift them before forming a conclusion. It must always be borne in mind that all parasites have a greater tendency to increase, especially in young animals, when there is a depressed state of system, owing to functional or structural alterations in the viscera or other parts.

(To be continued.)

## TREMBLING IN SHEEP AND LAMBS.

(From the North British Agriculturist, June 17, 1863.)

SIR,—Having of late had my attention directed to “Trembling in Sheep and Lambs,” I referred to your journal to see if there was any information to be got from it on the subject. In last year’s volume, June 4, p. 365, I found the following inquiries from “A Constant Reader,” viz. :—“What is the best preven-

<sup>1</sup> The intestines are readily opened with a pair of scissors, the blunt-ended blade being inserted, and the bowels pulled over it.



tive for Trembling in Sheep and Lambs in the months of April and May? Also explain the nature of the disease, and if there is any remedy—whether applying salt to the land would do any good, and what quantity should be used per acre? The lands lie principally on limestone rock.”

The answer given by your Veterinary Editor is not so explicit and satisfactory as I think it might have been. He says the trembling is “believed to consist in congestion and inflammation of the brain and its membranes.” His directions for prevention are certainly good, and, if acted upon, would no doubt have the desired effect. I presume the answer contains all the information which the profession can supply.

After some investigation into the subject, I have come to the conclusion that what is called “the disease” is easily accounted for, and might be prevented. I attribute it solely to bad management—unnatural and irrational treatment of the animals. The losses by it being very great annually, and the notions of the sufferers being so absurd and contradictory, and feeling, as they do, so utterly at a loss how to account for, or prevent it. I think it proper to make my views known, in the hope that some may benefit by them, or at all events that they may be judged of and tested by the experience and observation of others. The same reasons will perhaps induce you to give a place to them in your journal.

As I have said, there is a satisfactory answer given to the first question, it being in substance said, that the way to prevent the disease is by keeping stock in good condition, and by supplying suitable and nutritive food. I would take the liberty of adding, and giving them the benefit of such shelter as can be got.

As to the nature of the disease, the cause, evidently, is cold at a time when the animal is suffering from a deficiency of food, and not in a position to resist its effects. The cold sets the sheep a shivering, or “trembling,” and drives the blood from the surface to the vital organs, it may be to the heart, causing congestion and fever—to the lungs or liver, causing inflammation or derangement of the digestive organs—to the head, producing apoplexy; or to the other parts, producing other diseases, according to the state of the constitution generally, or the predisposed condition of any particular organ to be affected.

The cause, however, is the same, viz.,—*cold*, at a season when the animal is in low condition from a deficiency of nutritive food, and want of shelter—in short, as I have already stated, it is bad management, inasmuch as there is no proper provision made for the wants of the animal at the most critical season of the year—April and May; that being the time when the herbage of the previous season has all been eaten up, and the new has not made its appearance—when the ewe is in milk, and very susceptible of cold, the weather extremely variable, with often warm sunshine during the day, and sharp frost and piercing east or north winds at night.

The fact of the disease often commencing in a stock, or leaving it, with a change of tenant, where there is also a change of management, goes a long way in support of my views as to its cause and nature.

It is to Highland grazings in particular that I refer. All of them on which I am aware that there is, or has been, “trembling,” are—1st, such as have less or more of wood on the low grounds, or “wintering,” on which the grass is comparatively early and good, and have the summer grazing high and exposed, the ground almost entirely covered with heather (a great deal of it too old, not being burned enough, from very mistaken notions of landlords and sportsmen as to its need for game), and any grass that there is, late and dry and innutritious. Or 2nd, such as have the food which should have been left for the sheep eaten up by cattle or horses, or by overstocking, and where the heather also is allowed to get too old, and cover the ground.

It is the practice to send the ewes and lambs, when the latter may be ten days or a fortnight old, from the low sheltered ground, and the succulent nourishing grass, to the high, exposed, bare hills, where there is little or nothing for them, and it is from that time, and when the weather is such as I have described it, until a sufficiency of grass appears, that the mortality takes place—and why? Simply, I think, because the change has been so sudden and great. The ewe



has lost the soft, nourishing, and milk-producing grass, is subjected to a much lower temperature, and deprived of shelter at a time when she can ill afford to be so treated; want of food, and the cold together, drive the milk from her; the lamb continues draining off every drop which it can get; she necessarily is brought down in condition, and being in milk, becomes very susceptible of cold. The lamb suffers in a corresponding degree. Its supply of milk is in consequence, gradually lessened, and as it cannot provide for itself, and so make up the loss otherwise, it is soon in the same condition as the mother. Sometimes the one sometimes the other, goes first. A stormy day—sharp biting frost at night after a warm day—or keen east or north wind—produces the “trembling” in the reduced and weakened animals, which will end fatally, as before mentioned, if nourishing food and shelter are not timeously provided.

I have of course only been referring to the “trembling” in ewes and lambs during the months of April and May, or about that time of year, but other sheep will occasionally, and at all seasons, die from the same or other causes where one of the symptoms may also be “trembling;” but not being in milk, these other sheep have more power of resistance and endurance, and are not so liable to be affected. Sheep on long journeys at the end of the season, when exhausted by hunger and fatigue of travelling, will be very apt to take shiverings, which, if not treated properly in time, will result in the loss of the animal, and the death, I presume, will be attributed to “trembling.”

It may be said that there are many farms, where the pasture is but scanty, and inferior in quality, and where there is no shelter but that which the hills afford, on which there is no “trembling” among the stock. This is quite true, and easily accounted for. The stock may be uniformly in good, or, at least, fair condition. There is no sudden transition from low to high ground—from plenty good grass to poor bare hill pasture. The change in food and climate, on such farms, is only the change of nature, which is gradual, and to which the animal easily accommodates itself.

The way, then, to prevent “trembling” in ewes and lambs, if my views are correct, is obvious, viz., to keep the ewes and lambs on the low ground, and where they have plenty of food and shelter, till the season is sufficiently advanced, and the grass on the hills capable of supporting them, without any check to the ewe from the change, or to her supply of milk for her lamb. The remedy where affected must be equally clear: remove the lamb from the ewe, give her shelter and nourishing food—warm gruel, young clover, corn, and potatoes,—oil-cake, or what is at hand. If the lamb is still strong enough, it could be given to another ewe, or be kept on cow’s milk—making sure that it is kept comfortably warm, and not shut up in a cold damp house as is often the case. If the peculiarities of a farm are studied, the laws of nature attended to, and the animals provided with a sufficiency of suitable food at all seasons, and properly cared for otherwise, I do not think there need be much dread of “trembling.”

I am not aware whether the Highland and Agricultural Society have ever undertaken any investigation on the subject of trembling, braxy, rot, &c., in sheep. There does not seem to be any more important subject which could engage its attention. If it has not, I think that parties interested, who are members of the Society, might with advantage use their influence to get the Society to appoint competently qualified men for the purpose. Should it decline, I would suggest that graziers of a district form themselves into a society, in order to collect information as to the diseases of the sheep generally, and to obtain such professional assistance as may be thought necessary, with a view to prevention.—I am, &c.,  
R., Perthshire.



## THE ASS.

(From the *Scottish Farmer and Horticulturist*.)

SIR,—The columns of the *Scottish Farmer* having been made the medium for advancing the claims of the ass to more consideration than he at present obtains, I beg to trespass a little on your space, desirous as I am to add if possible some remarks with a view to show that it is fully as much in the interest of society as it is in the cause of humanity to have regard to one of the oldest and most constant servants of man amongst dumb animals.

The ass of modern times, in this country, is treated as if designed for men to exercise their cruel propensities on him; and even where more advanced intelligence prevails, it is the fashion to refer to that animal in depreciatory language. It is of the first importance that animals destined for the use of man should be put to their assigned purpose; the horse and the ass may be compared, but should never be put in competition in the same work, because, though bearing resemblance, they are essentially different, and the one cannot effectually supply the place of the other. Hence, when we see men cruelly beating the ass because he cannot keep pace with horses going in the same direction, we recognise a want of feeling, resulting in part from ignorance of the relative faculties of the two animals—the one being made and destined for speed, and from earliest times used for war, for the chase, and other pursuits where speed was required; whilst the ass, clearly designed to carry burdens, and to live on lands where only a spare supply of herbage grows, has always been the faithful servant of the man in humble station.

The first place in which we find the ass mentioned is where Abraham is going to offer Isaac for a sacrifice. Genesis, 22nd chapter, 3rd verse—"Abraham rose up early in the morning, and saddled his ass." No mention is yet made of the horse; and still we may, without doubt, conclude from the evidence afforded in the same book, that that noble animal was also known at the time and made subservient to man. We read of mules before the horse is mentioned—Genesis, 26th chapter, 24th verse—"This *was that* Anach that found the mules in the wilderness, as he fed the asses of Gibeon his father." In the same book of Genesis we read of horses at the time of Joseph; and in the second Book of Moses we find mention of horses and chariots as they were used for battle. Thus it appears, whilst the ass was used for the common daily requirements of the people, the horse was reserved for State occasions, and belonged to princes. This may account for his not being mentioned in the Tenth Commandment. The ox and the ass were the animals essential to the well-being of the neighbour, who the Law-giver saw required protection from the stronger; hence the animals and other goods specially used by the great, were not mentioned, because not possessed by those requiring to be shielded by the law.

If the subject be fairly viewed, we shall find that the division of labour between the horse and the ass has continued the same throughout all time, though the services of the latter have been more and better appreciated in some countries than in others.

Throughout the south of Europe the ass is the chief animal of burden, and is cultivated and valued more than in England. He is there bred with care, besides, for the intrinsic value of the stock of his own species, for the purpose of producing mules; these latter, whilst partaking of qualities common to both horse and ass, are superior to either in many respects. It may surprise some when I affirm that in Italy and Malta it is no uncommon occurrence for a good stallion ass to sell for £60, and for a fine young mule to fetch as much, those latter always realising a higher price than the young horses in the same districts.

A few words on the differences inherent between the horse and the ass.

The land, being distributed into mountains and valleys, produces herbage, and supports animals alike differently; whilst one species finds enough and to spare amongst the rocks in the higher regions, another requires the produce of the

more luxuriant valley. Thus, the ass gathers the thinly-dispersed fare, and stands in relation to the horse somewhat analogous to the goat with the sheep—whilst one species lives on sweet clover, the other crops the boughs and eats weeds.

The ass is superior to the horse of his height for carrying weight, but inferior to him in speed, except in one pace—viz., the walk. The gain to the first in power, and to the latter in speed, results from the different construction of the trunk, and the difference in the connection between the trunk and limbs. In the ass the spinal chain is arched; his chest is deep. It may be observed when seeing a boy riding an ass, that he does not seat himself across the middle of the back, the arched form not affording a good seat; but the rump is found the easier place. This form of back however, is admirably suited for carrying weight, and resembles that of the camel. With such qualities, it is quite impossible to supply the place of the ass by substituting the smaller of the horse species. The great error committed by those who keep asses consist in the belief that the animal requires no care, whilst good food in due proportion, with warmth and cleanliness, are most essential to the well-being of that animal. Native of an Eastern climate, the ass still thrives best there, and the soil he moves or stands on cannot be too free from moisture and filth.

The mule bears the vicissitudes of climate better than the ass; and that hybrid is so superior to his parent stock in working powers of a special kind, that it is matter of wonder they should not be more bred and used in this country than they are. In the kingdoms of southern Europe—viz., in Spain and Southern Italy—mules are exclusively used in the armies for artillery purposes and for the baggage trains. The animal is not used in the same countries for agricultural purposes, because oxen have been always exclusively adopted; yet everything seems to favour the hypothesis that mules would be the best of workers on a farm if they were bred of good size.

Some years ago, a friend of mine in the East Riding of Yorkshire, who was an acknowledged good judge of horses and breeding, consulted me as to the possibility of procuring a good foreign stallion ass, being confident that such an animal would have made profitable seasons in the district. At first glance, it might seem to tell against the production of good horses if mules were produced to great extent, but on reflection the reverse must be the more probable; the tendency would be more care and better selection with the horses, and the working animals would, so far as the hybrid was produced, be excluded altogether from influencing the qualities of the horse stock, and fewer bad bred horses would be perpetuated.

The name of Samuel Gurney, as that of the leader in this laudable cause, has given a hopeful turn to the question. The descendant of the family which gave a Mrs Fry, and one who inherits a family and personal connection with the renowned T. Fowell Buxton, is the most likely man to draw around him all the best available influences tending to promote his end; and the case he has in hand has the hearty good wishes for its progress of yours faithfully,

J. G.



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### ORIGINAL COMMUNICATIONS AND CASES.

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—o—  
*Statistical Notes as to the Original Causes of the Lung-Plague  
in Austria.*

IN endeavouring to ascertain the causes of the spontaneous origin of the lung-plague of cattle, several points have suggested themselves from the following questions, the answers to which have not, indeed, led much nearer to the object aimed at, but have given rise to investigations which in many respects, but chiefly to the veterinary public, are of interest. The present official returns enable us to make a comparison of facts such as scarcely any opportunity has hitherto offered. On this ground, therefore, the publication of the following remarks might be justified, the more so as they appear calculated to give rise here and there to more general reflections, which eventually may lead to a still clearer understanding of a subject which, although much spoken and written about, yet by no means yields the necessary information, and is nevertheless of the highest importance to the veterinary art and to rural economy.

The district to which the following report relates has an area of 174 German square miles, with an entire stock of 401,201 head of cattle, and is, with the exception of insignificant plains and of the higher Alpine tracts, in a good agricultural condition, and enjoys a flourishing trade in agriculture in all its branches.

As might have been expected, the present statistics are somewhat deficient, and seldom extend back to the time when the lung-plague might have broken out for the first time. Even in the cases in which the acts of the end of the last century recognise the appearance of cattle disease, the statistical report is deficient with regard to the characteristic symptoms of the same, so that many doubts exist as to whether the epidemic of that time was lung-plague, anthrax, or the frequently raging steppe-disease. Moreover, the tables are wanting in all the more minute information regarding the original causes, the systems of feeding, and other agricultural items,

so that regarding the earlier period little information can be obtained for the examination of the causes of the spontaneous or primary origin of the lung-plague of cattle, and the present statistics must be handled with the greatest care.

The veterinary art, which has been prosecuted with more accurate scientific knowledge during the last ten years than formerly, forms a more independent doctrine, and proofs have been produced by veterinary surgeons, founded on careful observations and experience, that the former theory, which attributes the lung-plague of cattle to local causes only and to miasmata, is an erroneous one, and demonstrate, that, so far as the disease has been witnessed in Europe, it does not originate spontaneously, but is produced and propagated in most cases by contagion. During that time also official returns have gained in completeness and value; and although the darkness that prevailed over the primary origin of the disease in question has in recent times to some extent dissipated, yet, on the other hand, we are forced to the conviction that on this subject proper we still possess no accurate knowledge.

The *questions* already referred to, comprise the following points:—

#### FIRST QUESTION.

*When, where, to what extent, and under what original causes, was the appearance of the Lung-plague observed in any district for the FIRST TIME?*

As already mentioned in the outset, the present statistical information is so deficient, that from it the time and place of the first appearance of lung-plague cannot be given with certainty; this much, however, appears probable, that this epidemic was not understood in the affected district at the beginning of the eighteenth century, though it was acknowledged as an epidemic from its characteristic symptoms. It may be received, however, with certainty, that the lung-plague appeared *rarely* in this district during the two last decades of the eighteenth and the first decade of the present century, and that from that to the present time it became always more frequent in its visits and observed a progressive advancement in extent. According to the evidence now come to hand, it is said to have appeared for the first time in Kutzenhausen in the jurisdiction of Zusmarshausen in 1786. Thenceforth no other first appearance of the lung-plague is recorded till the year 1805, when it broke out in Langennaufnach in the jurisdiction of Krumbach. After this, pestilential attacks of this kind occur more frequently and at shorter intervals—in 1810, at Oy, in Louthofen; in 1814, at Ueberbach in Grönenbach, and in the town of Lindad; in 1815, in Ricklingen, in Hochstadt, then in Rien, jurisdiction of Obergünsburg, and in Roggenburg; in 1816, in Wittisheim, jurisdiction of Montelm, and in Winden, jurisdiction of Neuburg; in 1817, in Langen, jurisdiction of Wertingen; in 1818, in Oberwaldbach, jurisdiction of Burgan; in 1819,



in the town of Augsburg, then in Karssheim, jurisdiction of Donauwörth, and in Oberlietzheim, jurisdiction of Höchstädt; in 1820, in the jurisdiction of Bissingen, Mundelheim, and Wallerstein. By degrees the first appearance of the lung-plague was declared in all the remaining circles, the number of which amounts to 36, and it is said to have appeared in the provincial jurisdiction of Jumenstadt for the first time in 1854, which, however, may be regarded as improbable.

Only in few cases are there accurate reports of the extent of the lung-plague at its first appearance; almost everywhere more particular accounts are entirely wanting, or they are so indefinite, that the exact extent reached by this epidemic at its first outbreak cannot be determined from them with certainty. In the greater number of first outbreaks of lung-plague the epidemic seems not to have extended beyond any single district; but from Lindau it is reported that the lung-plague, by means of contagion, spread itself from this town into 11 other districts. With regard to the number of cases of sickness, the first outbreak of lung-plague in Grossaitingen, described as of spontaneous origin, was of great extent. In Roggenburg (1815), and in Sternheim, jurisdiction of Ottobeuren (1840), during the first outbreak of disease, in consequence of contagion through importation, the half of the live stock is said to have been seized.

In 18 districts spontaneous development from local influence is assumed as the original cause of the first outbreak of lung-plague; in 11 cases it was caused by contagion in consequence of importation, and in 8 cases the original causes are not stated.

A number of local influences are mentioned which are said to have first created a predisposition for lung-plague, either in an individual animal or in a herd: these are, pasturing during bad, damp, and cold weather; early driving out of cattle exposed to wet, hoar-frost, and inundations; marshy pastures, late driving home, the great heat and drought of summer, deficiency of water, drinking out of puddles, mildew, over-exertion at work, bad stables; bad, wet, muddy, or mouldy fodder; malt-dust, distillers' wash, intercourse between infected and healthy cattle, high feeding, miasma, &c.

## SECOND QUESTION.

*When, where, how often, from what causes, at what period of the year, under what feeding, whether with unchopped hay and long-cut straw, with dry fodder or with moist, distillers' wash, or with boiled fodder, has the Lung-plague appeared in any place?*

The lung-plague, after its first appearance, has repeated its visits with ever-increasing frequency, especially from the first decade of the present century to the present time, and in the most recent times not a year elapses in which several outbreaks of lung-plague in various regions of the government districts have not been officially reported.

From 1786, in which year the first attack of lung-plague was generally recognised in the government district, the outbreaks of disease occur in the following order :—

In the Year.	No. of Outbreaks.	In the Year.	No. of Outbreaks.	In the Year.	No. of Outbreaks.
1786, . . .	1	1822, . . .	2	1839, . . .	3
1790, . . .	1	1823, . . .	9	1840, . . .	8
1797, . . .	2	1824, . . .	4	1841, . . .	15
1798, . . .	1	1825, . . .	4	1842, . . .	8
1805, . . .	1	1826, . . .	3	1843, . . .	16
1806, . . .	2	1827, . . .	6	1844, . . .	19
1807, . . .	2	1828, . . .	4	1845, . . .	17
1809, . . .	1	1829, . . .	7	1846, . . .	20
1810, . . .	1	1830, . . .	10	1847, . . .	22
1812, . . .	1	1831, . . .	5	1848, . . .	14
1814, . . .	2	1832, . . .	10	1850, . . .	17
1815, . . .	8	1833, . . .	7	1851, . . .	14
1816, . . .	5	1834, . . .	2	1852, . . .	9
1817, . . .	3	1835, . . .	6	1853, . . .	25
1818, . . .	6	1836, . . .	12	1854, . . .	24
1819, . . .	8	1837, . . .	11		
1820, . . .	6	1838, . . .	3	Total,	409
1821, . . .	3				

Hence without doubt a numerical increase in the appearances of lung-plague is going on, and it is also manifest that certain individual years are remarkable for the number of outbreaks of disease which have taken place during their course.

But also the lung-plague appeared in one and the same place, and at longer or shorter intervals, with varying frequency. It appeared most frequently in the town district of Urnsburg, always, however, only in consequence of contagion through importation, and confined itself as a rule only to individual stables. Moreover, the lung-plague repeated itself in one place (Günsburg) six times, four times in three places (Höchstädt, Buchloe, and Deiningen), three times in seven places, two times in eighteen places, and once in sixteen places. Accordingly, the above-mentioned officially recognised outbreaks of lung-plague in the government district, in all 409 in number, explain themselves by the manner of their first appearances. Of course, of these a considerable number may be called sporadical, *i.e.*, confined to single cases, in one or only few stables ; so that scarcely more than about 200 actual cases of epidemic are to be counted. It may, however, on the other hand, also be considered as certain that many outbreaks of disease, not only in single stables, but also in whole districts, were concealed, in order that the cattle-owners might not be obliged to submit to the troublesome police regulations, and thus might retain the free right of disposing of the cattle, which naturally must have favoured the propagation of lung-plague.

When the statistics of the original causes of lung-plague, that is, whether primary development from local influences, or contagion, called forth this disease, are examined, in 140 cases spontaneous de-



velopment, and in 154 cases contagion, is stated as the original cause; in 115 cases of lung-plague the original causes remain unknown.

With regard to the season of the year in which the lung-plague most frequently appeared 140 outbreaks occurred in harvest, 95 in summer, 91 in winter, and 51 in spring; 32 outbreaks have not been assigned to any particular season.

Regarding the feeding under which the lung-plague broke out each time, we find that it consisted in spring, summer, and harvest, at one time of pasturage, at another of green fodder without pasturage, according to the season of the year, then in winter of stable-feeding, hay chopped and unchopped, second crop hay and straw with and without mill-sweepings, and draff, and boiled food. This disease appeared, indeed, under every variety of feeding.

Although in many cases of outbreak of disease the special kind of feeding previously observed could not be more particularly specified, yet it must be evident that, in the most of the outbreaks of disease, it consisted of pasture-feeding, especially in late harvests, and the driving out of the cattle took place very early in the morning, when the grass was covered with dew and hoar-frost. Grass and hay also, polluted with mud after inundations, as well as impure water, have been enumerated frequently among the causes of lung-plague.

### THIRD QUESTION.

*In what districts has this disease not appeared hitherto, what is the sort of feeding usual there in summer and winter, and how is the exemption from the disease to be explained?*

There is no region in the government district which has not been visited by the lung-plague, but a very great difference exists relative to the predisposing causes, the frequency, and the extent of this disease.

The districts may be divided into those in which the spontaneously generated lung-plague appears comparatively seldom, and generally prevails to no considerable extent; and those in which the opposite is the case.

The districts which hitherto have been, to the greatest extent, exempted from the lung-plague, are—

1. The mountainous tracts of the government districts, the Allgäu and its promontory, comprising the districts of Southofen, Junnenstadt, Füssen, Lindau, Weiler, Grönenbach, Kempten, Oberdorf, Obergünsburg, and Kaufbeuren.

2. Next in order is the region between the Iller and the Güns from Allgäu to the Danube, which includes the districts of Otto-beuren, Babenhausen, Illertissen, Roggenburg, Neu-Ulm, and the town districts of Munsingen.

3. The third region is that called the Reisse proper, including the districts of Oettingen, Wallerstein, Nördlingen, Bissingen, and Wemding.

On the other hand, the regions most frequently attacked by lung-plague were—

(a) The districts of the Danube ; (that of Neuburg especially may be considered as the stationary head-quarters of the lung-plague), comprising the districts of Monteim, Donauwörth, Dillingen, Westingen, Burgau, and Günsburg.

(b) Next in order the plain between the Güns and the Lech, comprising the districts of Krumbach, Mindelheim, Turkheim, Schwabmünchen, Buchloe, Göggingen, Zumarshausen, and the town districts of Augsburg.

In general, this classification on the bases of the reports drawn up by professional men relative to the frequency of the appearances of lung-plague are tolerably correct.

For exemption, more or less, from lung-plague, as well as for the more frequent appearance of the same, various reasons are here given.

The rare appearance of the disease in the districts first mentioned, especially in Allgäu, is ascribed to the following circumstances :—

1. To the increased number of the present slaughter-houses for lung-plague, and to their general efficiency.

2. To the careful breeding and rearing of the cattle.

3. To the excellent pastures which produce the best and most nourishing provender.

4. To the uniform feeding with good fodder after the grazing season.

5. To the good quality of the water drank.

6. To the suitability of the stables.

7. To the rare employment of cattle in labour, and only in easy labour, when they are so employed.

8. And finally, to the circumstance that almost all the cattle were self-producing, and that they were increased in number on to a very small extent by cattle from elsewhere.

The distinctly stated conditions have without doubt preserved the cattle from diseases, and have evidently led to this result, namely, that the lung-plague more rarely appears in these districts. But we see, nevertheless, that it developes itself here as elsewhere, which authorises the statement *that the lung-plague* may even attack those cattle that have been reared according to the most favourable system of feeding, &c. ; consequently, the proper method of the breeding of cattle mentioned above appears insufficient to protect them wholly from this disease.

The following conditions are considered as reasons for the more frequent appearance of lung-plague in the districts distinguished as disease districts, without reference to the infection of healthy by sick cattle :—

1. The driving out of the cattle, especially in late harvest, at an early hour in the morning, in a fasting condition, and driving them



home late at night, especially through low, marshy, frequently inundated pastures.

2. Feeding with malt-dust, distillers' wash, or with fodder that is mouldy, rotten, or unclean.

3. Drinking bad water, especially from puddles.

4. Insufficient feeding, and sudden change from poor to rich and nourishing fodder.

5. Change of residence and mode of living.

6. Excessive heat and thirst—numerous insects.

7. Immoderate exertion when engaged in labour.

8. Bad stable accommodation.

9. Continual confinement of the cattle to the stables, and hence a deficiency of exercise and fresh air.

It cannot be denied that these unfavourable conditions induce a predisposition to diseases of various kinds, and, consequently, also to lung-plague; but more than the production of a decided predisposition cannot be ascribed to them, and these influences cannot be considered as the proper cause of lung-plague, as is usually done, if complete ignorance on the etiology of this disease is not to be the consequence.

There must be yet another agency besides those necessary to the development of the form of sickness now under consideration, since many of these pernicious influences, whether carefully concealed or otherwise, very frequently affect cattle without the lung-plague remaining stationary in such places, or in general breaking out frequently. Thus, during frequent inundations—generally esteemed as periods favourable to lung-plague, we observe that in the inundated districts of Mundel and Lambach, as well as in various regions of the Danube marshes, this disease has never appeared; and similar districts of the circle of Roggenberg, which are for the most part exposed to the inundations of the Güns and the Bieba, are said to be but very rarely visited by it; in the same manner, not much influence on the lung-plague is ascribed to the inundations of the Danube in the circle of Laningen. In like manner, feeding on malt-dust and distillers' wash is considered, by some of those engaged in drawing up the report, in the first rank of prejudicial influences in the production of lung-plague, while in many districts, and especially in Allgäu, this sort of feeding is by no means unusual, and here most rarely of all has the disease appeared. In general, almost all opinions agree in this, that the causes of exemption from lung-plague do not lie in the species of feeding, because that is the same in the exempted districts as in those in which disease has appeared. When we take all this into consideration, the declared opinion of those best informed on the subject appears correct,—viz., that at present we do not know the proper causes of the spontaneous origin of lung-plague among cattle.

Upon the origin of lung-plague, by means of contagion, on the other hand, many valuable observations have been made; and although of

the 409 outbreaks of lung-plague in the government districts, contagion has been officially shown to be the original cause only on 154 occasions, it may be received with certainty that the number of cases of disease was much more considerable, and also that of the 115 outbreaks, the original causes of which remain unknown, the greater number must, indeed all, have arisen from contagion.

From the reports obtained with reference to this, the following statements are especially noteworthy :—

From Gronenbach it is stated, that since the making of cheese has become so extensive, and on that account the breeding of young cattle no longer carried on as formerly, but milk-cows bought from elsewhere, the lung-plague has appeared much more frequently, in consequence of the importation of cattle.

In the report of the jurisdiction of Gögging it is announced, that there, when the trade in cattle is not so extensive, the lung-plague breaks out less frequently.

The district physician of Ottobeuren considers the limited trade in cattle from infected districts as the ground of exemption of lung-plague.

Professional opinions also from Obergünsburg, Roggenburg, and Weiler, are to the effect that in *the avoiding of contagion the principal means for the prevention of the outbreak of lung-plague are to be discovered.*

#### FOURTH QUESTION.

*What, besides the general orders, are the special police regulations concerning the natural propagation and the private concealment of disease?*

For the government districts there are, with respect to the lung-plague, orders, comprehended in the government proclamation of the 9th November 1819 ; further, there are the resolutions of the proclamation published 6th June 1844, directing the proceedings of the sanitary officers with regard to the diseases and contagious ailments of domestic animals, no other general official regulations regarding this disease exist ; however, in some districts voluntary measures regarding the most possible means of averting the propagation of cattle diseases, which well deserve consideration, have been adopted. In Allgäu, where live stock forms the chief riches, and their agricultural products are almost the only source of profit, the lung-plague, as has already been mentioned, appears the most rarely, and is subdued the most rapidly, by killing the infected and the suspected cattle immediately on the first appearance of this disease ; the loss thus arising is made up to the respective cattle-owners by taxes levied on the other inhabitants of the district, which measure has always been attended by the best consequences. Similar methods of compensation are adopted in Southofen, Weiler, and Junnenstadt. Further, in the districts above mentioned, a



rigorous inspection of live stock is carried on by the veterinary surgeons throughout the whole year.

In addition, the following noteworthy propositions, as regulations directed against the introduction of lung-plague, have been suggested.

1. Regulations regarding pasture inspection, and the draining of wet, marshy pasture-grounds.

2. The annual inspection of the whole live-stock by the veterinary surgeons.

3. The organisation of measures of compensation for the loss of cattle.

4. Prolongation of the time of quarantine among diseased cattle, and indicating they have passed the same by branding on the horns.

5. Rigorous inspection of meat.

We now reach what is important in the contents of the united reports furnished with regard to the lung-plague of cattle, and by means of the above questions already specially examined, we obtain the following results:—

1. The lung-plague of cattle was not recognised with certainty before the eighteenth century; its appearance at the end of the last and at the beginning of the present century has remained tolerably distinct, but from the middle of the second decade of the nineteenth century to the present time, it has repeated its visits with ever-increasing frequency in a striking manner.

2. The lung-plague is said to have a spontaneous or primary origin, as one by infection, in consequence of the transference of a contagious principle developed in the body of an infected animal, to a healthy one.

3. The origin of the lung-plague by means of contagion is certainly much more frequent than its spontaneous development.

4. All influences mentioned hitherto as causes of the spontaneous development of lung-plague, especially the varieties of feeding, the pasture, the fodder destroyed through inundations, &c., bad stables, negligent tending and rearing, excess of labour, change in the kind of food, and in the mode of life, are only to be considered as predisposing causes, which of themselves are not able to produce lung-plague. The longer and the more that such predisposing causes influence the constitution of cattle, the stronger the propensity, not only towards lung-plague, but also to other conditions of sickness.

5. The proper cause of the spontaneous origin of lung-plague we do not at present know.

6. As darkness rests over the proper original causes of lung-plague, though its pre-disposing causes are found for the most part in influences either irradicable or to be removed only with difficulty—as in the peculiar physical character of a district, in certain agricultural conditions, or in the poverty or indolence of the cattle-owners—so the most judicious measures are able to effect little or nothing in the way of its removal; on the other hand contagion, as

a cause of the outbreak of lung-plague, has much more extensive consequences, and therefore the regulations concerning the outbreak and the concealment of the propagation of this disease ought to have for their object the restriction of contagion.

For the restriction of the lung-plague of cattle to the smallest possible boundaries, the following means will be found most effective :—

(a) The educational improvement of the agricultural districts generally, especially the proper instruction of the peasants in tending and rearing cattle, as well as in feeding them in a manner suitable to their age, and to the various purposes they serve, but especially regarding the proper use of food suitable for cattle which has been derived as refuse from various manufacturing processes, and in the management of food for those animals which have been injured by exposure to bad weather, &c.; improvement of cattle-breeding, with special regard to the constant renewal of stock; the localities of suitable slaughter-houses, which then will be much less liable to lung-plague; home-breeding for the proper supply of the stock, as, through the importation of foreign cattle not only does a greater danger of contagion arise, but also the predisposition to disease among the cattle not accustomed to the local influences is increased; regulations for pasture lands, and directions regarding the judicious use of the same; improvement of pasture grounds; judicious arrangement of stables, especially of those newly built; easily comprehended summarised instructions for peasants as to symptoms of lung-plague and the great danger of infection from it.

(b) Suitable arrangement of veterinary affairs; proper communication of general instructions for veterinary surgeons, and the suitable direction of the proceedings of sanitary officials at the outbreak of the lung-plague, and in the case of its wider extension.

(c) Regulation regarding the money-deposits for the insurance of cattle.

(d) Introduction and rigorous maintenance of a general order regarding the inspection of meat.

(e) Thorough superintendence of all cattle-markets, and prudent organisation of the same where they do not already exist.

(f) Rigorous control over private slaughter-houses, and their abolition where that is possible.

(g) Organisation and energetic support of a system of cattle-insurance throughout the country, especially the founding of a general insurance either against all diseases and contagious ailments of the larger domestic animals, or one such special one against the loss sustained through the lung-plague of cattle, by means of which, at the first appearance of disease, an energetic interference is rendered possible. This arrangement would, at the same time, without doubt prove the most effectual measure against the concealment and transference of disease.



(h) The practice of inoculation as a prevention against the lung-plague in those stables and places in which it appears or is chronic ; also previous inoculation, as a necessary and preventive measure, but which can only come into general practice when compensation can be offered to the respective cattle-owners for the loss of cattle destroyed in consequence of inoculation, a result which can be reached in the best way by a system of cattle-insurance.

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*Case of Rupture of the Large Intestine occurring in a Mare during Parturition.* Communicated by W. C. PIGGOTT, M.D., Edin., M.R.C.S.L., Barbadoes, W. I.

IN offering the following case for publication, I fear that some apology may be necessary to gentlemen of the veterinary art for what may seem a meddling on my part with matters peculiarly their own. Therefore, in extenuation, I may be allowed to state that, living as I do in a remote colony where there is but one gentleman professing any knowledge of veterinary medicine, and being extremely fond of animals, I am in the habit of devoting all my spare time to the study of the veterinary art, practising on the horses, &c. of any of my friends who may allow me. Accordingly, a few evenings since, I was requested by a gentleman to see a mare that had dropped a foal a few hours before, and had appeared very ill ever since. On my arrival I found the animal already dead. Her foal was of average size, and appeared strong and healthy. The following particulars of the history of the mare were furnished me by her owner :—

Eight months since she was purchased from among a cargo of horses imported from the United States, the fact of her being in foal not being known at the time. At first she had been worked rather hard, but so soon as her gravid state was discovered her treatment had been better, and for the two months preceding the birth of the foal, her work had been very light. Her general health had always been good, and her appetite almost excessive.

She was first observed in labour at noon, and the foal was born at 1.30 P.M., the placenta and membranes being expelled soon after. During the process of parturition the mare did not seem much distressed. But immediately afterwards she appeared ill, not rising up or taking notice of the foal, but lying extended on her left side. She now rapidly grew worse, attempting to stand for a few minutes, but soon lying down in her former position. The whole surface was now wet with clammy sweat, the ears and extremities were very cold. The abdomen was greatly distended. There was also heaving of the flanks, and occasional convulsive movements. These symptoms became gradually more aggravated until her death at 6 P.M.

I made a *post mortem* examination fourteen hours after death, with the following result:—The abdomen was enormously distended with gas, not due to decomposition, as the body was remarkably fresh. On laying open the cavity of the belly a state of universal peritonitis was discovered, the cavity containing several pints of turbid serum, in which were floating shreds of flocculent lymph. The whole peritoneum, visceral and parietal, was of a light purple hue. The small intestines were moderately distended with gas, and the transverse colon was also filled, but not distended, with faecal matter of its usual consistence. On turning aside the small intestines there were found two holes in the cæcum, through which several pounds or excrement had escaped into the peritoneal cavity. One of these holes was circular, of the size of a half-crown, its edges black and sloughy; the other hole was a mere slit in the course of the circular muscular fibres of the intestine, its edges were of firmer consistence than those of the other orifice. These two ruptures were two inches apart, and the slit was some eight inches distant from the ileo-cæcal valve. The intestines were laid open throughout the greater part of their length to search for any ulcerations that might exist, but no such lesions were discoverable; the mucous membrane appearing healthy throughout its extent. There was no history of a kick or blow of any kind, and although looked for, no ecchymosis or discoloration was discovered in the portion of the abdominal wall covering the ruptured gut, the orifices in which were situated on that side the intestine next the spine. The uterus and its appendages were then examined and found healthy.

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*Statistics of Loss amongst Live Stock in the United Kingdom: being the Opening Address at the International Congress of Veterinary Surgeons, held in Hamburg.* By JOHN GAMGEE, Professor in the New Veterinary College, Edinburgh.<sup>1</sup>

It is my duty to state in a few words my reasons for asking the learned amongst the members of my profession to meet here and discuss questions of vital importance to the various European nations between which there is an increasing traffic in live stock.

It must be evident to all, that as there are vast regions in Europe where our domestic animals are naturally exempt from destructive plagues, it should be the interest of every people, and of every Government, to confine such plagues within their normal limits of spontaneous development. Too much praise cannot be awarded to Professor Jessen and Professor Unterberger, of Dorpat, and the

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<sup>1</sup> See Report of the International Congress in another part of this Number.



Russian Government, for striving to export animals that have passed through the attack of the Rinderpest, and cannot aid in propagating so frightful a malady; but it is evident that with reference to the Lungenseuche, Schafpocken, Maul und Klauenseuche, scabies, and other contagious disorders, there is the same recklessness in the traffic between different countries as there is too often between merchants and farmers in each country.

So far as Great Britain is concerned, we have a more extensive traffic in diseased animals than in any other part of Europe I have yet visited. Foreign traders think that any thing will sell in the London market, and the British farmers and butchers believe that the stomachs and constitutions of our metropolitan people are proof against the most active animal poisons. When I tell my hearers in Hamburg, that an animal dying from anthrax, whose entrails readily kill pigs, dogs, or other animals partaking of them, is sent to our city markets as readily as a healthy one, I can furnish no more striking illustration of the condition of the British meat trade.

The British Islands must throughout all time supply the Continent with stock animals for the improvement of breeds; and it is well known that purchases for this purpose have led to the transmission of contagious disease to many parts of the Continent. All Europe has an interest in the purity of British stock. But that Great Britain can afford to be active in preventing epizootic diseases, and must suffer if it is not, can easily be proved.

Reliable statistics as to the amount of live stock in Great Britain are wanting, and no official returns have ever been obtained in the United Kingdom as to the losses sustained by diseases amongst our domestic animals:

In 1854 it was estimated that in

England and Wales the number of cattle	
amounted to	3,422,165
Scotland (latest statistics, 1857)	974,437
Ireland (statistics for 1862)	3,250,396

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Total horned cattle in the United Kingdom . 7,646,998

The nearest approximation I can give of the value of this stock is L.10 per head. The stock lost is always the best, and, according to insurance statistics, amounts on an average to L.11, 10s.

The number and value of horned cattle thus accepted is, in my opinion, decidedly below rather than above reality.

The statistical information as to losses on the above stock is derived from personal experience, and from unpublished insurance statistics which can be thoroughly relied on, supported, as they are, in a very significant manner by the history of live stock insurance offices since their origin in 1844.

Prior to 1842, the average mortality amongst our cattle could not

be estimated at more than  $1\frac{1}{2}$  to  $2\frac{1}{2}$  per cent., but rumours then spread as to cattle plagues abroad. Reports of terrific losses reached this country, and the warning was followed by the introduction of epizootic aphtha and pleuro-pneumonia. The first was called the "epidemic," and the second the "new disease," the chief difference between the two being that the epidemic deteriorated stock, whereas the new disease destroyed it.

Inquiries were set on foot as to how the calamity should be met. Insurance societies had been established abroad, and similar associations were then considered indispensable here. This need, be it observed, was only felt after our ports were opened to foreign animals. Then inquirers proceeded abroad to learn the working of such companies; returns were obtained from all sources; and it was estimated that between two and three per cent. would cover the heaviest losses ever sustained throughout a country.

In 1844 the first English insurance society was established. It bore the name of "The Farmers' and Graziers' Mutual Cattle Insurance Company." Its patrons were wealthy and influential; its members were soon very numerous; the insurances effected attained vast proportions, and under the most favourable conditions, as many people were then more alarmed by continental reports than injured by disease at home. Pleuro-pneumonia, however, cleared out stock after stock and herd after herd in an incredibly short space of time. The company raised its rates of premium repeatedly. Disease, however, continued, and the affairs of this first mutual society became hopelessly embarrassed. Its books were closed four or five years after it was first established, and many have not received to this day heavy sums in compensation for losses amongst insured stock.

The apparent early success of the above company led in 1845 to the organisation of "The United Kingdom Mutual Cattle Insurance Company." Its business was good, but the same disasters naturally befell it as the sister company, and it was obliged to yield under the pressure of enormous liabilities it had incurred and could not meet.

In England and Scotland alone two millions' worth of live stock were insured in the first two years of the existence of the before-mentioned companies. There was an unlimited amount of business to do, but the larger the transactions the sooner could it be perceived that persistence implied ruin.

As mutual associations could not succeed, enterprising individuals resolved to obtain more correct information as to the real mortality amongst cattle; and to have a large reserve fund to meet any emergency that might arise. Accordingly in 1845 was published the prospectus of "The Agricultural Cattle Insurance Company," which was to be a proprietary association, with a capital of L.500,000. Expectations were as high on the part of the public as amongst the shareholders. The large capital, the absence of all copartnery risks, the still moderate rates of premium, and the alarming losses by disease, led to a very active trade. The business attained truly



enormous proportions, and insurances were effected at the rate of L.300,000 weekly for a considerable length of time. At the completion of the third year of this society's existence, ten millions sterling was the value of stock insured by it. No other provident institution in the world ever had such a business. But cattle were dying. The hurricane which swept away the earlier companies did irreparable damage to the new one. The annual report for 1848 says, referring to the lung disease in cattle, "that in some districts thousands were carried off; so great, indeed, were its ravages, that nearly three-fourths of the losses for which claims were made upon the company were the results of that incurable disease." The shareholders were summoned to meetings; call after call succeeded at short intervals; the rates of premium were raised, and the confidence of the public began to be shaken. All claims, however, were met; business again increased, but disease did not abate. The losses incurred during the first years could never be made up; and, struggling on under great difficulties, this, the greatest cattle insurance company that had ever existed, held out for seventeen years, but was compelled to wind up its affairs in 1861. Nor was this all. During the period of the apparent successes of the company, other associations of the same character had been established. In 1846 "The Scottish Agricultural Cattle Insurance Company;" in 1851 "The Essex Cattle Insurance Company," "The Bury Local Society," "The Bouldsworth Cattle Insurance Association," and "The Ecclestone Insurance Company." And these companies, one by one, had joined the "Agriculturist," so that when it ceased to exist it was not one, but six companies in one, which were annihilated entirely in consequence of the continuance of a frightful mortality amongst cattle. It deserves notice that several times in the history of the "Agriculturist" company, its Irish business was given up on account of the especially heavy losses which it entailed.

It is an instructive fact that insurance offices, after having calculated that their utmost possible losses would be coverable by a premium of  $3\frac{1}{7}$  per cent., eventually exacted premiums of more than double that amount, and yet came within a few years to ruin. No better proof can be given that the statements I have now to make are justified by the facts.

Very startling results are obtained by calculating the losses this country has sustained since the importation of cattle and of contagious diseases.

The most recent statistics of mortality to be relied upon are those of Scotland for the year 1860, which, on taking the average amongst stock of all kinds, amount to 4.89, or very nearly 5 per cent. If in 1860 the whole of the United Kingdom had (as I believe it at least to have had) the same rate of mortality as Scotland, in that year, there died of disease, in 1860, in Great Britain and Ireland 374,048 horned cattle, having, at the average value of L.10, 3s. 6d. per head, a total money value of L.3,805,939, 8s.; and if the Mid-

Lothian experience of the causes of death be applied to this matter, we may infer that more than half the loss was due to pleuro-pneumonia.

The number of cattle imported in 1860 was 104,569, and their value (at L.8 per head) may be estimated at L.836,552. It will thus be seen that the number of cattle estimated to have died by disease was 3.57 times the number imported in the year, and that the estimated deaths from pleuro-pneumonia were more than 1.89 times the number of cattle imported. Taking the estimated values, we find that the entire deaths from disease represented 4.5 times the value of the cattle imported, and that the deaths from pleuro-pneumonia represented considerably above twice the value of these imports.

As one year cannot be considered a sufficiently fair estimate, we may give the calculations for the six years ending 1860. The average annual loss of cattle during this period has been estimated at 4.915, or over the whole stock of the three kingdoms to be 375,850. The estimated total for six years amounted to 2,255,100. The value of animals lost amounted, at L.11, 10s. per head, to a grand total of L.25,934,650. Of this number there died from pleuro-pneumonia considerably above one million during the six years, and these represented a value of about twelve millions sterling.

The number of cattle imported during the six years ending 1860 was 553,033; their estimated value, at L.8 per head, L.4,424,264. The loss by disease was four times the number of cattle imported, and by pleuro-pneumonia it exceeded twice that number. On estimating their values, we find that the value of the cattle lost was 5.89 times the value of the importation, and more than half that loss due to pleuro-pneumonia.

The sheep of the United Kingdom have been estimated<sup>1</sup> at about 40,000,000, and are worth at least as many pounds sterling. Their average mortality by disease is not less than 4 per cent. It attains 5 per cent. in Ireland, and exceeds this in Scotland. The money value represented by the deaths over the whole kingdom is therefore not less than L.1,600,000.

There are, moreover, about 4,298,141 pigs, which may also be valued at L.1 a head, though usually considered as worth considerably more. In Ireland there is a loss at least of 10 per cent. on these animals. In Scotland the loss is small, and the mortality is not very great amongst them in England as compared with Ireland. I cannot, however, calculate it at less than 3 per cent. over the three kingdoms. This would give a loss in round numbers of L.1,209,000 sterling.

Thus the deaths among stock in the United Kingdom probably represent an annual amount of more than six millions sterling. In large towns the mortality of cows very greatly exceeds any proportion which I have stated.

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<sup>1</sup> By Mr Robert Herbert.



I fear that I have detained you too long with these statistics, but I expect you will not consider that I have been in error during the last eight or ten years, if I have constantly drawn attention at home to the injury inflicted on the British people by the foreign trade.

I do not want to abolish that trade—I wish to encourage it; but it is certain that in the course of time the trade must stop if the British Government, working hand in hand with foreign rulers, does not attend to the health of stock bred, bought, and sold, at home and abroad. We should have great uniformity in the laws relating to the diseases of animals in different countries, and it should be regarded as a punishable offence in any country for a man to sell or buy from a diseased stock for exportation. I do not wish to detain you further at present, and hope that this our first conference may be the first of many happy and useful meetings, and that by our continued exertions we may demonstrate the great importance of our noble profession, and show that in relation to the preservation of man's health, and the advancement of man's prosperity, we have public duties to perform which can alone be safely intrusted to us by the princes and people of each and every nation in the civilised world.

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*Poisoning of Three Milch Cows from eating Tea Sheet Lead.*

By W. A. CARTWRIGHT, M.R.C.V.S., Whitchurch, Salop.

FIRST CASE.—On Sunday, 17th May 1863, R. Cummings, Esq., surgeon, of Malpas, Cheshire, discovered a milch cow of his, ten years old, to be unwell. I did not see her alive, but learned the following particulars of the case from him. She had been gradually falling off her milk for a few days, and not feeding well. She afterwards gave but very little milk, and would not eat anything. She looked “penny” in her coat, humped her back, ground her teeth, and hung her head down, and her respiration was thought to be a little quicker than natural.

*Treatment.*—The owner kept her up, clothed her, and gave 1 lb. Mag. Sulph., &c. In a day or two after he called in a farrier of the name of Heighway, who gave her a purging drink. Little more was done in a medicinal point of view, and she was merely nursed and supplied with gruel and water for the four succeeding days that she lived. She stood up most of the time, and pushed her head quietly against the wall as if asleep. When drenching her there was some little difficulty in getting her head up; but she opened her mouth pretty freely, and occasionally she would drink a little water, but never ate anything all the time she was ill. During the last day or two of her life she kneeled down on both her knees for two or more hours at a time, and stood up on the hind legs, and propped herself up against the wall. Sometimes she would get up herself

and remain standing for hours. At times she was lifted up, but soon after she got in the kneeling posture.

Throughout the whole of the time she was ill she ground her teeth very much, and for a short time prior to her death she frothed at the mouth.

*Post-mortem Examination.*—This cow was not examined with any care, and was merely cut open by the butcher, who said she was “staked” in the manifolds, as the expression is about here. I am sorry I did not see her during life, or after death, so as to make a *post-mortem* examination.

SECOND CASE, 8th June 1863.—I was this day called in by Dr Cummings to make a *post-mortem* examination of another cow of his, four years old, that died yesterday afternoon, after four days’ illness, during which she manifested similar symptoms to the last cow.

*Post-mortem Examination, 8½ A.M.*—The *First Stomach* was pretty full of well masticated grass. On scraping the cuticular coat a thin pellicle came off very easily, and I then found that some portions of the muscular coat was of a rosy tint, as if inflamed.

The *Second Stomach* had but little in it, and there did not seem much amiss with it.

The *Third Stomach* was full of well-masticated food, and half of its contents, which lay near the œsophagean canal opening, was quite moist and natural, as if the medicine had been operating on it, the other portion was much harder, but still it was not too much so. The layers of food bore an immense number of marks, or punctures, from the papillary prominences on the surfaces of the leaves of the stomach—thus showing continued pressure. All the leaves showed great vascularity, as they were quite of a scarlet colour, and the blood-vessels distinctly seen.

The *Fourth Stomach* was about half filled with some soft digested food, and it contained a large quantity of small portions of evidently masticated tea sheet-lead. The lead lay in a great measure on the mucous membrane of the stomach, and not much mixed with the ingesta. We got the contents out, and washed and separated the lead, which was now very clean, and of a bluish black colour. It weighed one pound.

The whole inner surface of the stomach, including the folds, was of a dark grey colour, with scarcely a vestige of tint of vascularity or inflammation, and not by any means of its natural colour; it seemed as if it were thickened, and had a more velvety feel than natural.

The *Intestines*.—A great portion of the small ones were very much diseased. They were distended with air, but contained little food, and only some very liquid secretion of a dark colour. The mucous membrane was of a most unnatural colour, and in numerous places large patches of ecchymosis existed. The large ones were not so much diseased, but still they were in an abnormal state. The *Kidneys* were natural. The *Liver* looked very unnatural, and was of a pale clay colour, compact, and contained but little blood.



The *Gall Bladder* was full of bile, which was of a brown colour. The *Urinary Bladder* was contracted and healthy. The *Heart*.—All around the outside of the pericardium was ecchymosed, and of a dark red colour. The pericardium contained about half a pint of bloody coloured serum. The outside of the substance of the heart itself was of a dark red colour. Each of the ventricles contained black clots of blood. The interior of the left ventricle was more inflamed than the left one. The *Lungs* were sound. The *Brain* was injured by cutting the horns off.

THIRD CASE.—On the day (6th June 1863) I was making a *post-mortem* examination of the second cow that died, I saw another, four years old, belonging to the same gentleman, ill in the cow-house, and apparently in an almost dying state. She was taken ill about the 1st June, but had been falling off her milk for several days before. She lived five days, and had had symptoms just like the others. When I saw her she was kneeling down on her knees in the “boosy,” with her head leaning towards the wall, and standing up on her hind legs. She did not even seem to have any apparent fits of violence, nor had any of the other cows. I had her brought out of the cow-house into the yard, and she walked there with difficulty, as she was very weak and tottering, and could scarcely stand. Her eyes apparently were insensible to light or the movement of the finger, and the pupillary openings were nearly closed; indeed, I do not think she could see, as we had to guide her where she went.

She was frothing now at the mouth, and ground her teeth. Her respiration was but slightly increased, but her general appearance was as bad as could be, and she evidently had not long to live. Her pulse at the heart was but slow, and intermitted at every 4th, 5th, or 6th beat, as if the heart was unable to contract on its contents. She died in the afternoon.

*Treatment*.—On the first day that she was seen to be seriously ill, she had given to her 2 lbs. of salts and some ginger; afterwards she had but little done to her besides supplying her with gruel and water. In consequence of finding the lead in the other cow, I ordered to be given  $\bar{\text{z}}$ iv doses of mag. sulph., combined with æth. sulph., or aqua vitæ, every six hours, but she died before the treatment could be put in force.

*Post-mortem Examination*.—The *First Stomach* was well filled with masticated grass. The cuticular coat peeled off very easily, and there was nothing particularly unusual to be seen in its substance; except in some places the muscular coat had a slightly rosy tint.

The *Second Stomach* contained very little indeed of anything; and its internal surface was of a dull white colour, without a vestige of inflammation about it, but in it there was, I should think, about half a pound of finely ground portions of tea sheet-lead of a blue-black colour. The interior of the stomach had the appearance as if it had been cleaned with lime for making tripe. The cells were quite natural in their structure.

The *Third Stomach* was in a similar state to that of the second cow's. We washed some of its contents, but could not detect any lead in it.

The *Fourth Stomach*.—This stomach was evidently the great seat of disease. It contained about three quarts of liquid interspersed with some finely masticated and partially digested grass, and was of a dirty colour. The mucous membrane was thickened, and of a brownish colour. There was also a large quantity of finely ground tea sheet-lead, without a vestige of the paper on it, and which was of the same blue-black colour as that found in the second case. We emptied the whole contents of the stomach into some water, and after repeated ablutions, we had left one pound or more of finely chewed lead.

The *Intestines* and *Liver* were in a similar state to those of the second cow. I forgot to examine the heart.

*Observations*.—The doctor informed me, that last year he had a quantity of sheet tea-lead by him, and in cleaning places out, he most imprudently had it thrown amongst other rubbish on the dunghill; and in the month of November the manure was carted out on a field of ryegrass and clover; that during this spring about eighteen of his cows were turned into this field and another, alternately, as was thought proper; that he never saw anything the matter with them of any importance, until they were taken ill, as before stated, and had not the most distant idea of what was the cause of their illness; but still, from the symptoms, he was inclined to suspect that they were suffering from the effects of *some poison*, and consequently sent for me to make *post-mortem* examinations, to find out, if possible, the cause of death. I am sorry I did not see more than one during life, and that only for a short period prior to death, or I should have been better able to have given an account of the symptoms of such interesting, and I fancy unique, cases; but I think there cannot be a doubt but that they were all poisoned by eating this lead, as the juices of the stomachs would act as a solvent, the lead being at the time in a very comminuted state.

On going into the field where the manure had been spread, we picked up several pounds weight of it, the greater part of which lay in lumps on the surface, and other portions were a little imbedded in the soil. I am almost inclined to think that even some of that we picked up had been masticated, and afterwards dropped out of the mouth, as it was in lumps.

[Mr Cartwright alludes, in writing to us, to other cases of lead poisoning in a sow, two pointers, pigs, &c., and warns farmers against buying painters' manure. On this subject information will be found in the *Veterinarian Vade Mecum*, Edinburgh edition.]



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### INTERNATIONAL VETERINARY CONGRESS.

THE success attending the first International Congress of Veterinary Surgeons has certainly exceeded the expectations of all who had taken an interest in its proposal. The effect of the discussions must prove very salutary, when we consider the unanimity of opinion amongst veterinarians of all countries who attended officially so as to secure uniformity in sanitary regulations relating to epizootic and contagious diseases. The learning of Hering, the practical handling of subjects by Röhl, Nicklas, Gerlach, Haubner and others, the vast information of Fuchs and Unterberger, and the eloquence of such men as Hertwig and Zaugg, invested the meeting with an interest which could only have been excited by such speakers.

The opportunity which such a Congress has afforded to veterinary surgeons throughout Europe to meet, to know each other, and exchange ideas on topics of vital importance to many nations, is as yet unique; and it is satisfactory to know that many of the leading professors in Germany have now pledged themselves to further the prospects of a second and similar reunion. When the official report is published, it will be seen that there are differences of opinion amongst men of different countries; and it will be important to establish to what extent such difference, which only extends to matters of detail, depends on circumstances that should not be overlooked. Thus the Germans are decided advocates for the inoculation of cattle as a preventive against the lung-disease, and ovination as a preventive for small-pox in sheep. But it is certain, with regard to the latter, that on English downs and open pasture-lands the malady does not spread so rapidly as in the foul stables of Eastern Prussia or of Pomerania; and, with regard to pleuro-pneumonia, it is generally certain that there are circumstances under which inoculation may be practised with advantage, and others under which it deserves unqualified condemnation.

One of the most important, if not absolutely the most important, points taken up by the Congress was that of determining the diseases which should be prevented in countries, by enforcing laws which aim at eradicating the disorders. We believe that no better means

could have been devised for introducing reforms in all matters relating to the management of diseased cattle than that of holding such meetings as took place in Hamburg from the 14th to the 18th of July.

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### THE INOCULATION OF SHEEP FOR SMALL-POX.

It will still be fresh in the memories of most of our readers that in the autumn of 1862 there was a keen discussion in the public journals, and especially amongst the Wiltshire farmers, as to the value of variolous inoculation amongst sheep. Professor Gamgee opposed the practice, and Professor Simonds had encouraged it. Professor Gamgee's view is satisfactorily established by the remarks which were made on the 23d of July in the House of Commons. Though Mr Lowe did not mention Mr Gamgee's name, the statistics quoted are those which will be found in that gentleman's reports on the Wiltshire outbreak. The discussion in the House, as reported in the *Daily Telegraph*, was as follows :—

“Mr D. GRIFFITH asked the Secretary of State for the Home Department whether the Government intended to take any steps for the prevention of the practice of the inoculation of sheep with the virus of sheep small-pox, or ‘variola ovina,’ for the presumed object of mitigating the disease, on the principle of the actual prohibition in force against such practice in the case of the human subject; and also what had been the results of the Government experiments of trying the effects of vaccination as a preventive of the sheep small-pox on a certain number of sheep obtained by the Government for that purpose? In putting the question, the hon. gentleman stated that the Wiltshire association of farmers altogether disapproved of the practice of inoculation, and that they had found vaccination, but chiefly separation, alone efficacious in preventing the spread of the disease.”

“Mr LOWE said, that with regard to the experiments that had been made in the way of vaccination by Professors Marsden and Simonds, he was sorry to say that they had been very unsatisfactory; but with regard to the question of inoculation, experience, no doubt, was very much against it. In those flocks in which it had been used, 20 per cent. died, while in those in which it had not been used the mortality was only 1-6th per cent. At the same time, it was another question whether it would be right absolutely to prohibit a man from inoculating sheep his own property, provided he took sufficient precaution, by separating them from the flock, against spreading the disease. He could give no exact pledge on the subject, but the conviction of scientific gentlemen was, that there could be no more imprudent thing on the part of farmers than to inoculate their flocks.”



INTERNATIONAL CONGRESS OF VETERINARY SURGEONS  
IN HAMBURG.

On Tuesday the 14th inst., a large number of professors and practitioners of the veterinary art, from all parts of Europe, met together in the spacious hall of the public gymnasium, Hamburg, which, through the kindness of the Leith vice-consul, Mr Robinow, was secured by Professor Gamgee for the meetings of the Congress. The Hanseatic Government has done all in its power to further the objects of the Congress, and foreign Governments have liberally supplied the means and authority for the veterinary professors in their respective colleges to attend at the meetings of the Congress.

The first duty devolved on the assembly to appoint office-bearers. Professor Herring of Stuttgard, universally esteemed and respected, owing to his unwearying exertions in promoting the best interests of his profession, was unanimously appointed as president. Professor Gamgee, of the New Veterinary College, Edinburgh, was appointed vice-president, and besides these, two secretaries, a treasurer, and committee of management were chosen.

The success of the Congress exceeded the expectations of all. Upwards of eighty Professors and practitioners met together from all parts of Europe. To give an idea of the keen interest taken by foreign Governments in the prevention of plagues amongst animals, we may state that no less than four Professors were sent from Russia, three from Austria, three from Prussia, and others from Hanover, Saxony, Bavaria, Würtemberg, Heidelberg, Switzerland, Sweden, and Denmark. Owing to the death of M. Renault, Inspector of Veterinary Colleges in France, and to the examinations at present going on in all the French schools, the French colleges were unfortunately not represented. Another death, of the Director of the Brussels College, prevented any one being present from there; and many other mishaps led to letters—regretting apologies of absence being sent instead of representatives attending. It is to be regretted that only one British Veterinary College was represented; but one of the Messrs Field, well known throughout the country as an eminent veterinarian, was in attendance from London.

Amongst the gentlemen present were Professors Hertwig, of Berlin; Röhl, Müller, and Pillwax, of Vienna; Nicklas and May, of Bavaria; Zaugger, of Zurich; Haubner, of Dresden; Gerlach, of Hanover; Unterberger and Brauell, of Russia; Stockfleth, of Copenhagen, &c. &c.

The object for which so many Professors have been despatched to Hamburg to attend the International Congress was well stated by Professor Haubner, of Dresden, who said that they were sent there to ascertain what measures should be recommended so as to

ensure an efficient co-operation between different governments interested in the prevention of cattle and sheep plagues.

Professor GAMGEE, of Edinburgh, as the originator of the Congress, was called upon to address the meeting in explanation of its objects, and for a statement of the reasons which had led him to issue a circular in the month of March last.

Professor RÖLL, of Vienna, was called upon to lay before the meeting the facts connected with the outbreak of the Russian plague, or steppe disease, in the Austrian dominions. The learned Professor accordingly gave a tabular statement of the losses, and showed that from 1849 to the middle of May 1863, out of a total stock of 2,562,585 horned cattle in the districts invaded by the disease, 495,188 took the disease. Of these affected animals, 253,515 died, and 233,273 recovered. There were slaughtered by Government orders, 8311 diseased animals, and 3075 infected ones. The Austrian and Prussian Governments attempt to prevent these losses by a rigid quarantine of twenty-one days' duration for all Polish and Russian cattle. This, however, leads to smuggling, and as no instances can be recorded of the disease having a longer period of incubation than nine days, it was suggested that, to prevent smuggling, the quarantine had better be reduced to fourteen days. All admitted that the quarantine was essential to preserve the lives of the cattle in Eastern Europe. Professors Unterberger, of Dorpat; Nicklas, of Munich; Hertwig, of Berlin; and Untritz, of St Petersburg, were the principal speakers on this subject; and although the Russian representatives thought that the quarantine was of little service, it was evident that a different opinion was entertained by all others present. Professor Röll's suggestion was, however, esteemed reasonable, and, on putting the question to a vote, it was agreed to recommend the shortening of the period of quarantine.

Professor RÖLL then communicated to the Congress some very interesting and rather alarming facts as to the spread of the Russian plague through flocks of sheep. Hitherto the malady had been regarded as confined to the ox tribe, but many facts were brought forward by the learned Professor to show that this was not the case, and that sheep were the most likely animals to communicate the disorder to Western Europe.

Several observers confirmed Professor Röll's remarks, and urged the institution of proper experiments in infected districts to throw additional light on the subject.

The Congress had next to deal with the lung-disease in cattle—the contagious pleuro-pneumonia from which British stock-owners have suffered so much. Professor Nicklas, of Munich, stated that in Bavaria, and in all other parts of Central Europe over which his investigations had extended, the lung-disease in cattle was purely a contagious disease. In Bavaria, it had led to an annual mortality of a very serious nature, and the Munich slaughter-houses used to be full of diseased cattle. He had suggested energetic measures, so



as to compel cattle-dealers to be extremely cautious in their dealings, rendering them liable for all losses which purchasers of cattle might sustain from the lung-plague. He had adopted the system of separation and early slaughter of the diseased animals, with the inoculation of all apparently healthy but also infected ones; and he was happy to say that, whereas thousands of diseased cattle entered Munich yearly some time back, only one case of pleuro-pneumonia was seen in the Munich slaughter-houses from the middle of 1861 to the middle of 1862, and none since. This shows that preventive measures were adequate even against such a disease as the contagious pleuro-pneumonia of cattle.

Professor FUCHS, of Heidelberg, said that Professor Gamgee had referred to a heavy mortality by the lung-disease in the British Isles, and he had stated that upwards of 50 per cent. of the cows in large towns were annually swept away by this disease. He (Professor Fuchs) wished to know what the British Government did to stop such frightful losses, and what preventive measures were adopted.

Professor GAMGEE said that in the British Isles the system was to eat all the diseased cattle, and not to prevent disease. They had no preventive measures; and last year, from the Edinburgh dairies alone, 1075 diseased cows were supplied to the citizens of Modern Athens, and it was quite clear that, as he had repeatedly suggested, such measures as Professor Nicklas had recommended in Bavaria should be enforced in the United Kingdom.

Many of the Professors attending the Congress spoke on this subject, and it was declared without a dissentient voice, that the malady, so far as Western Europe was concerned, was of purely contagious origin; that it called for energetic measures for its prevention, and that the early separation of diseased animals and inoculation of the remainder of infected herds, were attended with the very best results. Professor Gamgee held that inoculation was only necessary in dairies, and he believed that under proper regulations professional men might inoculate with success. In London the dairymen and quacks operated without the least good effect, as they caused gangrene of the tail, and often killed the animals. Amongst oxen, he found that separation and supporting the infected animals on tonics answered every purpose.

The next subject taken up was the enumeration of diseases concerning which sanitary measures should be enforced by Governments.

Professor FUCHS said that above all it was of importance that in different states they should know which diseases should be regarded as generally dangerous and contagious. He had prepared a list, and he wished the sense of the meeting on that list, and he would then advise accordingly at headquarters on his return to Heidelberg. This was a most favourable opportunity for him, as they were revising the laws relating to contagious diseases in the Grand Duchy of Baden. The Congress determined that the subjoined diseases



came properly within the scope of legislative enactments. They were—Contagious diseases communicable to man: Rabies in the dog; anthrax in all domestic animals; glanders and farcy; epizootic aphtha, or the foot and mouth disease; mange of the horse, ox, goat, dog, and cat. Contagious diseases of animals not communicable to man: Pleuro-pneumonia contagiosa; Rinderpest, or the Russian plague; small-pox of sheep; malignant foot-rot of sheep; eruptive disease, of stallions.

The parasitic diseases which several members of the Congress drew attention to were regarded as properly coming under the head of maladies calling for rigid inspection of slaughter-houses by able professional men, and this was especially the case with trichinous disease and measles or hydatids of the pig.

Some interesting facts were related of the communication of mange from animals to man. Professor Gamgee suggested the exclusion of cow-pox from the list drawn up by Professor Fuchs, as he thought it was rather beneficial to mankind when vaccine was abundant; which was agreed to. In Prussia, the milkmaid who enables a doctor to collect pure lymph from a fresh vesicle receives five thalers, which is 15s. of English money.

Professor HAUBNER, of Dresden, drew special attention to the losses which different countries sustained from the filthy condition of cattle-trucks, in which diseased animals of all kinds were congregated. He was quite certain that no good would come of radical preventive measures without effectual supervision of railways, and insisting on the thorough ablution of trucks used for cattle, as also on the employment of disinfectants when necessary. He wished the special attention of different Governments to be drawn to this subject; a proposal to which the Congress unanimously agreed.

#### SMALL-POX IN SHEEP.

Professor GAMGEE addressed the meeting in explanation of the progress of this disease in 1862 from Pomerania to Mecklenburg, Hanover, and Holland, and both through Hamburg and Rotterdam to England. He gave the history of the Wiltshire outbreak, and strongly condemned the practice of inoculation, which he said kept up the disease on the Continent, and both directly and indirectly led to great losses amongst English flocks.

Professors GERLACH of Hanover, HAUBNER of Dresden, MARCUS of Mecklenburg, &c., referred to the great losses which followed the inoculation of sheep last year, and by a unanimous vote the Congress recommended the abolition of the system of inoculating flocks which were perfectly healthy. Some insisted on the value of inoculation whenever the disease appeared.

On Friday, Professor Hertwig, of Berlin, took leave of the assembly, and made a very feeling and eloquent speech on the evidence which the Congress afforded of vast strides made in the pro-



fession to which he had devoted his life, and which he felt to be more noble and useful the more we could learn of its influence for good.

On Saturday evening the 18th inst., at seven o'clock, the business of the Congress was drawn to a close, when Professor Hering, the President, addressed the meeting.

Professor HERING said—Permit me, gentlemen, to close the present meeting by a short recapitulation of our labours, and of the conclusions to which we have arrived. The idea of a similar meeting of veterinary surgeons, not only for the purpose of discussing subjects belonging to our profession, but which should bear an international character, is due to our Vice-President, Professor Gamgee, whose country has of late suffered more than any other from cattle-plagues, owing to its free-trade system. This idea met at once with my entire approval, and our enterprise began under favourable auspices, and with the promise of assistance from Vienna. We must admit that we were not sanguine as to the probable success of our plans, the more so as many more pusillanimous minds lost no time in predicting their utter failure. Nevertheless, I may safely say that the expectations formed by each individual member of this Congress have been far exceeded by the result. Upwards of eighty veterinary surgeons, and amongst them many names of high repute, have taken part in our deliberations, either from pure devotion to the science, or sent to our Congress by their respective Governments. It is manifest, both from the nature of this meeting, and from our social position, that we can arrive at no other than a solely scientific conclusion, and that it is only in the power of the different Governments to call these into positive existence for the well-being of mankind. Scientific men—nay, the different scientific bodies—have, ere now, arrived at similar conclusions whenever their notice has been directed to questions like those which we have discussed; but this result has been always considered as merely one of individual experience. Now, for the first time, has a meeting taken place to whose resolutions a hitherto unknown value and importance must be attached. We openly proclaim the high importance of our mission, and no Government will ere long be able to turn a deaf ear to advice which is founded on so broad a system of research. For the first time has our profession drawn upon itself the earnest attention of Governments and rulers. Could we adduce a more striking proof of the importance of our labours than the discussion referring to the Russian plague, and the valuable suggestion to prevent the smuggling of infected cattle towards the Austrian and Prussian frontier, a result hitherto unattained by the military cordon system? What heavy losses are sustained by all European countries through the wide-spreading lung-disease, and what gratitude would we deserve could we but eradicate this plague completely! The ever-increasing transport of cattle, especially by railway, threatens, it has been rightly observed, to

break down every barrier which we endeavour to oppose to the dissemination of the cattle-plague; and more caution than ever has become necessary as to our modes of conveying cattle. It is of vital importance, at any rate, that where a plague has broken out, it should be in the shortest possible time restricted within the narrowest possible limits, in order that the innocent should not suffer for the guilty. That this is not possible without a strictly organised system of sanitary regulations is self-evident; and thus is it all-important that the Congress has arrived at a positive conclusion as to the diseases which call for Government interference. Permit me to thank you, gentlemen, for the honour you have done me in choosing me as your President. It is the greatest honour I have been the recipient of during forty years of professional life.

Professor ZAUGGER, of Zurich, then called for a vote of thanks to the Vice-president, Professor Gamgee, and in doing so said it was strange that one so distant from them as one of their Edinburgh colleagues should have summoned them to so happy and useful a meeting. He did not believe that any other individual in that room would have had the same weight as Professor Gamgee in urging foreign Governments to send, not one single, but many representatives to take part in a meeting which never could be forgotten, as it formed an era in the history of the veterinary profession in Europe.

It was afterwards resolved that the next International Congress should take place in Vienna in 1866; and the meeting then separated.

[We understand that an official report will be published in the English and German languages.]

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## ROYAL COLLEGE OF VETERINARY SURGEONS.

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### QUARTERLY MEETING OF COUNCIL.

The Quarterly Meeting of the Council was held this 15th day of July 1863.

PRESENT :—The President, Professors Simonds and Varnell, Messrs Broad, Ellis, Gardiner, Harpley, Harrison, Jex, Mavor, Moon Robinson, Secker, Wilkinson, Withers, and the Secretary.—The President in the Chair.

The minutes of the preceding meeting were read, and confirmed.

A letter in reply to the address of congratulation to Her Majesty was then read.

It was moved by Mr Wilkinson, and seconded by Mr Harpley—“That the letter now read from the Secretary of State be entered on the minutes.”—Carried.

Communications were read from the several gentlemen accepting



the office of Vice-Presidents, to which they had been elected on a former meeting of the Council.

A letter was submitted from Dr Struthers relative to the number of candidates to be examined on each evening at the sitting of the Board of Examiners in Scotland, stating that they had examined 16, and the English Board 12.

It was moved by Mr Wilkinson, and seconded by Mr Secker—"That the Secretary inform Dr Struthers that the usual number examined each evening was 12; but on the concluding day of the meeting of the Court of Examiners an additional number have been occasionally examined."—Carried.

The Registrar's Report announced the death of Mr William Bunnell, Liverpool; also that 55 members have been admitted from the Royal Veterinary College, London; and 35 from the Veterinary Colleges, Edinburgh. The names of the members admitted were read, those who were rejected, and also the names of the Examiners and *ex-officio* members who were present.

The Inquiry Committee brought up their Report, which was submitted. The Committee recommend,—“That a Bill for the better regulation of the practice of veterinary surgeons throughout the United Kingdom be prepared for the approval of the Council, with a view to its being introduced into Parliament; and also that a Petition, embodying the principles of the Bill, be presented to the House at the next session; and that a Special Committee be appointed to carry out the above recommendation.”

It was moved by Mr Wilkinson, and seconded by Mr Robinson—"That a vote of thanks be given to the Chairman and Committee for their exertions."—Carried.

Professor Simonds then moved that the Report be received, which was seconded by Mr Secker, and carried.

The Report from the Finance Committee and the Quarterly Balance-sheet of the Treasurer's Account were submitted:—The current expenses for the quarter amounted to L.102, 13s. 10½d., which they recommend should be discharged. The Finance Committee drew the attention of the Council to the disbursements in Scotland; that vouchers had not been furnished, and that it is desirable they should be.

It was moved by Professor Simonds, and seconded by Mr Robinson—"That the Report and Quarterly Balance-sheet of the Treasurer's Account be received and adopted."—Carried.

Cheques were ordered to be drawn for the current expenses.

The re-appointment of committees for the year was then proceeded with, viz.:—The Finance Committee to consist of Messrs Braby, Ellis, Harpley, Moon, Simonds, and Wilkinson. The House Committee to consist of Messrs Field, Mavor, Spooner, and Withers. The Parliamentary Committee to consist of Messrs Field, Gardiner, Goodwin, Harpley, Harrison, Jex, Mavor, Moon, Secker, and Varnell.

The business of the Quarterly Meeting having terminated, a

Special Meeting was then convened—the same members present—to consider the alteration of by-law 28.

After having been proposed by Mr Wilkinson and seconded by Mr Secker, the amended by-law, to the following effect, was carried:—“Any candidate failing to obtain his diploma after two examinations, shall pay a further fee of three guineas on each and every subsequent occasion of presenting himself before the Court of Examiners.”

Mr Robinson then called the attention of the meeting to the proposed new by-law, which had reference to the section of the Court of Examiners in Scotland; the certificates not having been retained by the Secretary and forwarded along with the remittances.

The new by-law was to the following effect, viz.:—“Each candidate, seven days prior to his examination by the section of the Court of Examiners acting for Scotland, must leave with the Honorary Secretary of the Court a fee of seven guineas for such examination, together with a certificate, or other legal proof as may be required, of his having been educated at one of the recognised colleges or schools.” After having been proposed by Mr Robinson, and seconded by Mr Secker, it was carried.

By order of the Council,

WILLIAM HENRY COATES, *Secretary*.

A Special Meeting of the Council was held this 2d day of July 1863, for the purpose of confirming the alteration of by-law 28, and the new by-law by Mr Robinson—

PRESENT:—The President, Messrs Braby, Gardiner, Harrison, Jex, Mavor, Wilkinson, Withers, and the Secretary.—The President in the Chair.

The minutes of the Quarterly and Special Meeting at which the said by-laws were adopted were read and confirmed.

The altered by-law No. 28, and the new by-law, having been read and submitted, it was moved by Mr Mavor, and seconded by Mr Jex—“That the alteration of by-law No. 28, and the new by-law made at a special meeting of the Council held on the 15th day of July, be now duly confirmed.”—Carried.

Mr Wilkinson gave notice of motion for the alteration of by-law 21, which was ordered to be suspended in the Board Room for three months.

By order of the Council,

WILLIAM HENRY COATES, *Secretary*.



## PERISCOPE.

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## WHAT IS INSTINCT?

BY SHIRLEY HIBBERD.

M. Flourens has added to the long list of books bearing his name one on *Instinct and Intelligence*,\* in which he reviews with some care the opinions of all the great authors who have written on the subject, and supplements those opinions with suggestions and deductions of his own. We cannot award M. Flourens any high praise, either for originality or profundity, but we would be content to gather from his pages any useful items of information, and thank him for obtruding upon our attention a most interesting subject, could we do so without suffering the vexation of seeing logic superseded by sophistry, and truth made the slave of human pride. But M. Flourens follows very faithfully the example set him by the authors he reviews. It is perhaps a hazardous proceeding to utter a general condemnation, but we fear it is but too true that the only honest writers on this subject are those who take the most ridiculous views of animal instinct and intelligence. For instance, Descartes in his "*Discours sur la Méthode*," denies animals the power of thought, on the ground that they do not possess the faculty of speech. He says, "Although beasts do many things as well, and perhaps better than one of us, they infallibly fail in many others;" by which, he says, it may be inferred that "they do not act from knowledge, but only by the disposition of their organs." "It is a remarkable thing," he says, "that there is no man so stupid, excepting only the insane, who is not capable of arranging together divers words, and composing a discourse; but, on the contrary, there is no other animal, however perfect, that can do the like, and this not only proves that beasts have less reason than man, but that they have none at all."

Buffon is equally honest, and almost as absurd. He admits that brutes have sense and feeling, and also that they have a consciousness of their actual existence, *but not of their past existence*; they have sensations, but no power to produce ideas. Upon these grounds Buffon denies that animals are capable of thought, reflection, and memory, yet he avoids the extreme view of Descartes, that they are merely vitalized automata. "Condillac is right," says M. Flourens (p. 41), "when he says, If beasts invent less than we, if they perfect less, it is not that they fail entirely in intelligence, but that their intelligence is more limited; but he is wrong when he says that it is by a sort of invention—that is to say, because he *compares, judges, and discovers*—that the beaver builds his cabin, or the bird constructs his nest, and therefore all his theory upon the faculties of animals is vicious, because he confounds two things which are essentially distinct, namely, *instinct and intelligence*." The most entertaining of all the disquisitions on this subject is undoubtedly that by Lord Brougham, in the "*Dialogues on Instinct*," wherein he takes care to put down all the sage remarks to his own credit, and makes Lord Spencer responsible for statements most easily refuted. In this delightful book numerous examples of (so called) instinctive operations are described and analysed; but in spite of the noble author's manifest desire to be liberal and just, it is but too evident he is influenced by what Smellie, in the fifth chapter of his "*Philosophy of Natural History*," designates "mistaken notions concerning the dignity of human nature." To sum up this bibliographic note, without reference to many less distinctive opinions, we must notice two other attempts to solve the riddle of instinct, if only for the purpose of showing what opposite opinions may

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<sup>1</sup> De l'Instinct et de l'Intelligence des Animaux. Par P. Flourens. Paris, Garnier Frères, 6 Rue de Saint-Pères.



be entertained of the same subject. Father Bougeant, a learned Jesuit, in a tract called "A Philosophical Amusement concerning the Language of Birds and Beasts," affirms boldly that animals are capable of thought and reflection, and to escape all the difficulties arising out of "mistaken notions concerning the dignity of human nature," contends that the actions of animals are entirely the result of the influence of evil spirits,—that in fact the brute creation is under the dominion of the devil. On the other hand the great Newton considered that all animals were under the immediate operation of the Deity, and that consequently their instinctive and intelligent actions were alike the expressions of divine impulses.

The definition of instinct commonly subscribed to is, that it is a blind impulse, that it acts without knowledge either of the means employed or the effect to be produced. With all their professions of dissent from Descartes, the majority of definers, with Lord Brougham for leader, have concurred in his opinion that animals are like clocks: the Creator has wound them up, and they must continue as long as their races last, accurately, unchangeably, and ignorantly, in the course of action first appointed them. Brougham classes instincts as physical and mental. Physical instinct, he says, is independent of mind altogether, and mental instinct is independent of reason altogether. The example generally chosen is unquestionably the most difficult, no matter what prejudice we lean to, or however perfect may be our freedom from bias of every kind. We are called to examine the work of the honey bee. Here are hexagonal cells, which afford a maximum of strength, and consume a minimum of material. They terminate in rhombic dodecahedrons, they incline at an uniform angle, so that the liquid they are constructed to hold shall not escape, and they are arranged in the hive so that between every double set of cells there is sufficient space for traffic between them. There can be no dispute as to the general accuracy of the work, and as to the fitting together, by proper relationships, of all the events and operations incidental to the life and industry of the hive. But we may reasonably dispute the fairness of instancing the work of the bee as an example of blind, untaught, objectless instinct; for this simple reason, that all the evidence for such a view is of a negative character. Brougham sums up the matter thus:—"Laying aside those actions of animals which *show a glimmering of reason*, and confining ourselves to what are purely instinctive, as the bee forming a hexagon without knowing what it is, or why she forms it, my proof of this not being reason, but something else, and something not only differing from reason in degree but in kind, is from a comparison of the facts—in a word, from induction. I perceive a certain thing done by this insect, without any instruction, which we could not do without much instruction. I see her working most accurately without any experience, in that which we could only be able to do by the expertness gathered from much experience. I see her doing certain things which are manifestly to produce an effect she can know nothing about, for example, making a cell and furnishing it with carpets, and with liquid, fit to hold and to cherish safely a tender grub, she never having seen a grub, and knowing nothing of course about grubs, or that any grub is ever to come, or that any such use, perhaps any use at all, is ever to be made of the work she is about. . . . In all this she differs from man, who only works well, perhaps at all, after being taught; who works with knowledge of what he is about, and who works intending and meaning, and in a word designing, to do what he accomplishes. To all this may be added, though it is rather perhaps the consequence of this difference than a separate and substantive head of diversity, the animal works uniformly and alike, and all his kind work alike; whereas no two men work alike, nor any man always, nay, any two times, alike. Of all this I cannot indeed be quite certain, as I am of what passes within my own mind, because it is barely possible that the insect *may have some plan or notion in her head, implanted as the intelligent faculties are*; all I know is, the extreme improbability of it being so." Now, although this theory of instinct has been generally assented to, we do not hesitate to challenge it, in the belief that we shall be able to prove that it is of the same species of sophistication as the quibble of Zeno, that a man cannot walk a mile.



First, we will submit it to a test which may always be applied with fairness, that is, we will apply the author's conclusions a little more extensively than he has done himself. The bee makes a hexagon without knowing what a hexagon is, or what it is for, though she herself is to fill it with honey or pollen, and seal it up when filled. Ergo, the bee visits a flower without knowing it is a flower, she extracts honey without knowing it is honey, or that honey is her proper food. She flies through the air to some distant place without any expectation of finding there the flowers that yield honey, and she goes to a place she has much frequented, and which abounds with flowers which yield honey plentifully, without knowing she has been there before, and in fact without intending to go at all, and without any idea of what she will do when she reaches her destination. She returns to the spot she started from without knowing that it is the spot, or that she is a member of a community, or that her interests are identified with the bees composing that community, or that there is a community, or any such thing as another bee in the world besides herself. Indeed, we do not see that she need know even of her own existence, if she is so fatefully mechanical as to build and furnish a cell without knowledge of what it is, or any forecast of its future uses. If we accept the first hypothesis, we cannot refuse the second; if we invent premises, we must follow them to their ultimate consequences. It is not long since we heard a schoolmaster argue thus:—"Brutes have no soul, therefore they cannot reason. The elephant is a brute, therefore it is only a vitalized machine; it cannot reason."<sup>1</sup> We can scarcely avoid classing the exercitations of Lord Brougham with those of our syllogistic friend; in fact, of the two we prefer the latter, because the sophistry is delightfully apparent.

Now as to the proofs. Who can say that the bee does not know why she forms a hexagon? When we observe that bees quickly select the best honey-producing flowers, as, for instance, mignonette, spergula, bramble, Dutch clover, salvia, nemoralis, &c., &c., to the neglect of others which furnish little honey, we applaud their sagacity, and say nothing about blind impulse. We know of no impulse to direct bees to lime trees in such numbers that their humming oftentimes alarms the passer-by, nor do we know how mere instinct should cause them to neglect the garden, when they have choice of the more odoriferous flowers of the moorland. She is allowed to know what honey is, and to distinguish between good and bad honey; she is granted the faculty of distinguishing a rose from a cabbage, and the bee-master from an intruder, of detecting a robber bee upon the threshold, and of recognising the presence or absence of the mother of the hive; but when her work intrudes upon the domain of mathematics, we are startled from our propriety, and at once forget our former conclusions of the capacity of the bee to observe, remember, and reflect, and suddenly insist that she is doing something in utter ignorance of what she is doing, or that she is doing anything at all. The researches of Maraldi and Torre on the work of the bee, have literally nothing to do with the question of instinct, for it cannot be contended that because the work of the bee is mathematically perfect, that therefore she must be as ignorant of her own work as a clock is that it is recording the true time.

"I see her working without any experience," says Brougham. It is a gratuitous assumption that the bee has no experience. It is quite possible that bees inherit experience as man does, for it must be remembered there is an experience of the race as well as an experience of the individual. But let us look at the facts. Dr Beven and other authorities concur in the opinion that the worker bee lives from six to eight months. Mr Taylor, the author of the best book on bees, adopts this view. In the course of twenty-one days from the laying of an egg by the queen bee, the egg has been hatched, and the worm has completed its last metamorphosis. An individual bee, therefore, may witness the birth of *nine or ten* successive generations of workers in the course of its lifetime, and transmit

<sup>1</sup> The person whose words are quoted above enjoys an enviable fame as a trainer, and has been most successful in his vocation; that is, measuring success by the number of his pupils. It would be cruel in this connection to publish his name.



the experience gained thereby to those successive generations by a process of teaching. But putting aside the possibility of teaching, here, at least, is experience, which it is so essential to deny on the theory of instinct being a blind objectless impulse. But this is not all. Mr Desborough, of Stamford, set himself to work out a solution to the question, How long does the queen bee live? and the writer of this saw all the apparatus used by Mr Desborough, and believes in the soundness of the conclusion arrived at, that the same queen continues active and fertile during a period of *four years* at least; how much longer she endures Mr Desborough was unable to ascertain with certainty. It is surely as reasonable to conclude that the experiences of bees are of use to the community as the experiences of men; and seeing that they have abundant opportunity for acquiring experience, we prefer to believe that they work by knowledge, rather than adopt a theory which derives no support from observation.

It is equally an assumption that the bee works uniformly, as it is almost a falsity to say that men work diversely. If a hexagon fulfils the conditions of a given case, and there is no other form that will fulfil those conditions, then there must be a hexagon whether the worker be bee or man. A broad view of human affairs will show that man is as much the slave of impulses and blind instincts as the bee, if we are to admit impulses and instincts at all as separate from actual knowledge. The philologist tells us that all languages are easily reducible to a few elementary forms. The ethnologists say that there is very little diversity in the fashion of human habitations, and our present experiences tells us that in all our works of art we draw upon the past, and are much more occupied in repeating what has been done than in inventing things unattempted yet! Even in the domain of literature there are but few primary ideas: all the Greek epics and tragedies were framed out of the same half-dozen stories, and at the present day there is no nobler form of verse known than that in which Homer sang. Granted that men do work diversely, though to a much less extent than is generally supposed, so does the bee. A newly-hived swarm works with more vigour than the population of a well-stocked hive. If the work of the bee be interrupted, there is an immediate adaptation to the new circumstances of the case, and when a disaster happens there is a speedy resort to new methods of procedure, either to avert its worst consequences, or to repair the damage the community has sustained. As to the alleged perfection of the works of the so-called blind instinct, that is the most gratuitous assumption of all. The work is not uniformly perfect, but frequently very imperfect, and in this respect exactly parallel to the occasional aberrations of acknowledged intelligence. For instance, bees will sometimes collect pollen in such prodigious quantities as to prejudice their own well-doing, and lack honey for their own use, while heaping up bread superfluously for a small progeny of young. What becomes of the theory of instinctive perfection in the face of such a fact as this? Yet it is very like the occasional mistakes of men; as when a ship laden with leather boots puts into a port where the people are starving for want of bread, or, as in the case of the Crimean war, green coffee was sent to men who had neither fires to roast nor mills to grind it. Were the instincts of bees so perfect as they are represented, we should never witness examples of the queen dropping eggs at random, because there are no cells to receive them, nor should we see in honey boxes that the first combs were often so badly placed, that in the end the bees had to fill up odd nooks and corners with twisted and triangular patches, which are at any time significant comments on the theory of instinct infallibility. Probably Lord Brougham, and many other learned writers on instinct, never had to shift a few stocks of bees from one place to another in a garden, or to hive swarms, or take boxes of honey, else we might have heard much less about the alleged uniformity of procedure and invariable perfection of results. What is the instinct which prompts bees to a savage exercise of their powers to wound and poison when molested?—do they not know what they are doing? and have they no object in pouncing on the marauder? If they sting the man who takes the harvest so carelessly that they discover the trick before it has succeeded, is it not fair to conclude that they know



they are being robbed, and avail themselves of the means of punishment with which nature has furnished them?

We have argued this case on the basis of the mathematical theory of bee economy. Respecting this theory there are two things to be said. First, it is not true; secondly, it demands so much of the bee that it compels the adoption of a false theory of instinct. Error and folly are boon companions; the supposed mathematical accuracy of the angles of cells required us to believe that the bee had learnt, without teaching, what a large proportion of human beings could not learn with teaching, or to account for the whole affair by supposing the insect to be under a mysterious power, the attempt to define which made it more mysterious. Notwithstanding Brougham's remark, that "there is no bee in the world that ever made cylindrical cells," it is very certain that the bee makes nothing else, and that hexagons and rhomboids are alike the result of pressure, and represent the angles of equilibrium between the pressure and the resistance, just as the orbits of the planets are the midway lines between centrifugal and centripetal forces. The insect is not such a mathematician as has been generally supposed, and, therefore, when it is demanded for bees that they know somewhat of the nature of their work and its intended uses, all that is asked is to allow them as much intelligence as is needful for the construction of simple cylinders of the same size as their own bodies. It is true we have not now accounted for the fact of their working to a common plane, or for the ordinary disposition of cells on either side of that plane, by which a double comb is produced. These certainly appear to be instinctive operations, but they are of that kind which Brougham admits "show a glimmering of reason;" and if there be a glimmering anywhere, we know for a certainty that there somewhere near at hand light is to be found. In the "Annals of Natural History," for June 1863, will be found an analysis of the mathematics of the beehive, by the Rev. S. Houghton, in which the theory of the bee forming hexagonal cells is completely overthrown. We owe it to our friend Mr W. B. Tegetmeier that we were long ago convinced that bees make cylindrical cells, and as we have seen those cells in formation, and can generally find some in the outer portions of removed comb, there is no other course left us but to ascribe to the laws which control inanimate matter the mathematical wonders which have been made the basis of a sophistical theory of instinct.

We have spoken decisively as to the utter ignorance of the bee in mathematics, and the difficulty of the hexagonal cells is annihilated. We have room to say that the alleged economy of material is as great a delusion as the other. We owe it to Mr Houghton that our attention has been called to the investigation by mathematicians of the relation of expenditure of material to the mathematical requirements of connected cells of given dimensions, and of a form adapted to the uses to which they are to be put. L'Hullier, in 1781, using MacLaurin's method, arrived at the conclusion that the economy of wax referred to the total expenditure is  $\frac{1}{51}$ , so that the bees can make fifty-one cells instead of fifty, by the adoption of the rhombic dodecahedron. But L'Hullier maintains that mathematicians can make cells of the same form as those of the bees, which, instead of using only a *minimum* of wax, would use the *minimum minimorum*, so that five cells could be made of less wax than that which now makes only four, instead of fifty-one out of fifty. But suppose, again, that we grant the alleged economy of wax, we only get out of one difficulty for a moment to encounter a greater, the moment the theory of a mathematical instinct has been propounded for general purposes. Say the hive bee has attained to perfection in her work, what, then, of the humble bee? Is she to be shut out from a participation in this wonderful instinct, or shall we grant her the higher faculty of reason, and so account for her abuse of the laws of geometry, as we see in humble bees of the human race, who frequently waste timber, stone, and other materials, through ignorance of leverage and the nature of strain in constructive operations? Certain it is that the humble bee uses, proportionately, more than three times the amount of material in the construction of cells than is used by the hive bee; and if the hive bee is so far from attaining to the ultimate possibility of perfection in the economy of wax,



how should the humble bee excite our pity and give occasion for the theorists to lament that facts are against them ! Nature has not commissioned these insects to teach men mathematics, nor has she commissioned men to deny them a share of the same intelligence which, in human affairs, vindicates its existence in a great measure by its errors.

But this will suffice, perhaps, for the present about bees. We have said so much only because this is the favourite example of the theorists who contend for a mental instinct, and limit it by boundaries furnished out of their own imaginations. M. Flourens institutes a categorical inquiry into all the mental qualities of animals, and, up to a certain point, very satisfactorily. Let us, adhering to his method only as far as may be convenient, glance at some of these qualities as we see them manifested. It is admitted, even by the automatists, that animals have a consciousness of their existence ; but then they say they have no power of thought. "How," asks Flourens, "can they have consciousness without knowledge, and knowledge without thought?" What is consciousness but knowledge, and what is knowledge but retained impressions and ideas? "They have *no memory*. What! this dog, which *distinguishes*, that is to say, *recognises* the places he has lived in, the streets in which he has run ; who has been corrected by chastisements, who seeks for the master he has lost, who goes and dies upon his tomb,—this dog has *no memory*!" It is a smart jump from the bee to the dog, and it is a jump we make, and not M. Flourens. But when we are confined to a brief summary of arguments, extreme cases are best, and the bee offers an example of the extreme one way, and the dog the other. Now let us compare them. They have no speech, says Descartes, and there are foolish people of the present day who join with him. Then the whine of a dog at the door on a cold night does not imply that he wishes to be let in. The deep bay of the mastiff, when there is a sound of a strange footstep at night, is not to be understood either as a warning to the master, or a threat to the thief, or an expression of the dog's suspicion that all is not right ; it is only a fortuitous sound, the result of purely physical causes, and may rank with any of the sounds produced by inanimate nature. But perhaps there will be no dispute as to the speech of the dog ; but it will be asked, Has the bee speech also? We answer *yes*. The writer of this has had bees under his observation daily for a period of over fifteen years, and could bring forward examples to illustrate every requirement of a theory of insect intelligence were it needful, and would space permit. But one instance will suffice. A bee, whom we will call A, is entangled in a spider's web ; he has been liberated and placed on the floor-board in front of the hive. Another bee, whom we will call B, approaches, and exchanges with the victim of Arachne a few passes of the antennæ. B immediately enters the hive, and presently returns with two others, C and D. B, C, and D then commence cleaning A of his entanglements, and in so doing get somewhat entangled themselves with the glutinous threads. Every now and then there is a pause, and all of them engage in bringing their antennæ into mutual contact, and occasionally, after one of these conferences, a new method of cleaning is tried ; and the end of it is, that the object of their solicitude, A, is at last purified of his spidery pollutions, and all enter the hive together, and we see no more of them. The observer concludes that they made communications to each other on the subject of A's troubles, and by mutual agreement determined on his release from bonds, and the cleansing of their own persons of the defilements he had unavoidably fastened upon them. If a man were entangled with ropes, and his comrades consulted how to release him, and eventually succeeded, we should not describe the act as the working of a blind impulse, or of an instinct which neither knew what it was doing, nor what was the object of its labours ; why then should we degrade the bee by denying that she has knowledge, or attempt to prove her deficiency of knowledge by hazarding the assertion that she is incapable of speech ?

What is Instinct? We could not attempt to answer this question until we had first done something towards clearing away the absurdities of theorists who trusted more to syllogisms than to observation, and to fancy rather than to fact.



What are called physical instincts are no doubt very often, but not always, "independent of will or mind altogether." About these we will not raise a question. But mental instincts appear to be of the same nature as reason, directed with intensity in a narrow channel. It is an instinct of the bee to collect honey. We must grant that it knows what honey is, and what honey is for, and by so far the act of collecting is the act of reason. But it is pursued with such ardour, that it becomes the fixed habit of the insect, and a habit may be followed so mechanically, that it may on a superficial view appear to be but a blind impulse, and to be performed without knowledge. But no matter how strong the force of habit, if, initially, it is the result of an act of reasoning and the expression of a *motive*, and is followed for a *purpose*, then it can never be separated from mind; though when the habit is fixed, it makes little or no demand upon the mind until some exigency arises demanding a deviation from habitual rule. Let the reader reflect upon any habit of his own, as that of reading without noticing the individual letters of words, without thinking at all of the rules of punctuation and pronunciation, without perceiving at all the minute relationships of words to each other, and occupying the mind only in following the thoughts of the author, and the act of reading will appear to be purely instinctive. Yet we know it is not, and have never considered that men were machines simply because of their capacity for literary pleasures. Test the comparison by reference to any other act which is performed habitually, as the motion of the foot in turning the lathe when the mind is wholly directed to the action of the cutters, and how much like what we call instinct in animals is the effect of habit in ourselves. How the bee first acquired the art of extracting honey from flowers, and building comb from wax, we know not—the inquiry into that matter must have its place in the general inquiry as to the beginnings of all things; but we much rather believe that her work is the result of intelligence and performed with knowledge, and capable, up to a certain point, of improvement by experience, and, in a word, the result of reason modified by habit, than an ignorant and, so far as she is concerned, purposeless endeavour to accomplish an end which she neither foresees nor has any care about.

It may be said that after all we have only exchanged one word for another. Such is not the case. We have no objection whatever to the employment of the word Instinct, provided it be no longer considered as something independent of mind. We would rather regard it as the proof of mind, and as something impossible, except as a mental product, or, as we have said above, the work of mind rendered tolerably uniform by habit. Let us illustrate this.

Every distinct breed of dogs has peculiar instincts. A thorough-bred shepherd's dog will take to sheep with scarcely any teaching, but a dog of any other breed will require very careful training to be able to take care of sheep, and then be but a bad sheep dog. The instinct to protect sheep is initial in the individual sheep dog; but if all dogs are from the same stock, it must be a habit transmitted, not an aboriginal instinct. In fact, so far as we understand the dog, its pure instinct would lead it always to worry and never to protect sheep. There is no breed of dogs that will follow game by scent with the steadiness of the hound; but if the following be an instinct, why is the pointer deficient of it? The answer seems to be, that in the first instance the hound has been taught, his mind has been informed, and the knowledge gained thereby is transmitted to his offspring, just as Sir John Herschel has inherited from his father a taste for astronomy, and has followed it by the light of reason and not by the light of instinct. Terriers and spaniels will hunt by scent, but they will not *pack* as hounds will, and hounds undoubtedly pack because they run at large game, and one individual would be insufficient to cope with it. A well-bred pointer will point at game the first time he sees it, and need scarcely any teaching beyond such as is necessary for obedience to calls and such like minutiae. Sir John Sebright, in his "Observations upon Instinct,"\* expresses an opinion that "the

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\* Published by Gossling and Egley, New Bond Street, 1836.



greater part of the propensities that are generally supposed to be instinctive are not implanted in animals by nature, but that they are the result of long experience, acquired and accumulated through many generations, so as in the course of time to assume the character of instinct." Whether we accept this opinion as sound, or reject it altogether, we must tacitly consent to it whenever it is our object to produce a breed of animals required for any active purpose ; and in dogs especially the breeder will prefer cleverness before beauty, and in choosing a sire ask first about his performances, in the full expectation of a progeny capable of exhibiting superior ability.

All our knowledge is relative, and it is therefore vain to seek for a perfect theory of the intellectual powers or a definition of instinct utterly unassailable. But it is not difficult to perceive, that in harmony with the development of form, so is the development of mind—there is least of both in zoophytes and insects, and most of both in man. But it is a violation of the law of harmony in creation to consider the mind of the brute as in any way different in kind from the mind of man. The difference is in degree only, and in man we find all the powers of all animals combined, instincts included, some scarcely discernible, others prominent in his character ; but they are all there, and it is this combination that gives him command of all the elements as the master of the world. We may seek in man for illustrations of all the mental and physical qualities of animals, and perhaps do better by reasoning upon facts associated with experience, than upon facts removed from the range of experience. Thus, instead of inquiring what is the nature of purely physical instincts in brutes, let us ask what is their nature in man. The beating of the heart, and the peristaltic motion of the intestines, are called physical instincts ; they are performed involuntarily, and are ordinarily independent of the will. But what is the act of swallowing ? It is a voluntary act, yet for the most part it is performed without a thought ; and while engaged in an animated conversation at the dinner table, we swallow without knowing it, and sometimes without having knowingly experienced any sensation of pain or pleasure from the flavour of the food which has been passed to the stomach. A deliberate act of deglutition is certainly the result of mind in action—the will is operative, and we know what we do, and why we do it ; but an unconscious act of swallowing is instinctive, and the first act of swallowing by a newly-born infant just put to the breast is an instinctive action. Without certain of these aboriginal instincts, animal life would be impossible ; but their range is limited, and they are all physical in their nature, and it is manifestly erroneous to class them with actions that imply choice, and that are evidently the result of some kind of calculation based upon experience. Whenever the action is elective and conditional we assume the existence of mind, and see signs of its activity. From such instances as these we may trace the gradations upward to the highest attainments of reason, but we must never forget that we are tracing a gradation, and not passing from one category to another, from one kind of reason to another kind of reason, any more than we would dare to assert that there are two kinds of matter, knowing, as we do, there is but one.

Through not keeping these principles in view, M. Flourens has gone quite astray from the truth in his amusing but superficial essay. He says, "The cry of an animal can reveal an idea, but is not the produce of an idea ;" as if he had for some time lodged in the brain of a brute, and had satisfied himself of its destitution of ideas. "Animals," he says, "have no language, their cries are not known signs, they have their natural voice, but they have no speech," as if for the purpose of communicating information and ideas by vocal sounds, which from everyday experience we know they do, it were necessary for them to frame grammars and write epics. "Reflection well defined," he says, "is the knowledge of thought by thought. And this power of thought upon thought gives us all an order of new relations. As soon as the spirit sees, it judges ; as soon as it can act by itself, it is free ; as soon as it is free, it becomes moral. Man is only moral because he is free. The animal follows the body ; in the midst of this body, which is enveloped in matter, the human mind is free, and so free that it can,



when it wishes, even immolate the body itself." We have a parrot which occasionally sings—

"I am perfectly free  
To climb up a tree  
But I can't get out of my cage."

We fancy M. Flourens, with all the freedom he accords to man, is himself very much in the condition of our parrot.

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## ON THE "LAMB DISEASE," OF WHICH PARASITES IN THE LUNGS ARE GENERALLY THE CAUSE, OR CONSEQUENCE.

By EDWARDS CRISP, M.D., F.Z.S., late Physician to the Metropolitan Dispensary.

### PRIZE ESSAY.<sup>1</sup>

(Continued from page 460.)

#### PART II.

#### I. ANALYSIS OBTAINED FROM THE ANSWERS TO THE QUESTIONS ADDRESSED TO AGRICULTURISTS BY THE BATH AND WEST OF ENGLAND SOCIETY ; WITH DEDUCTIONS BY THE AUTHOR.

*Questions for circulation among Practical Farmers for the purpose of collecting information in regard to the Disease in Lambs, of which Parasites in the Lungs are either the Cause or Effect.*

1. What are the symptoms of the disease ?
2. At what age of the animal are they generally first discovered, and at what time of the year ?
3. As the disease progresses, what changes do the symptoms undergo ?
4. What form does the disease take in its last stages ?
5. Is it always or generally fatal, or fatal only after a certain stage of the disease has been reached ?
6. What is the state of the animal after death, particularly its lungs and windpipe ?
7. Have you always or generally found worms or other parasites in the lungs or windpipe after death ; and describe them if you have ?
8. Do you know at what stage of the disease they are first found in the windpipe or lungs ?
9. Do you suppose these parasites to be the cause of the disease or the consequence of it, or why ?
10. Are any particular breeds of sheep liable to this disease more than others ?
11. Have you known it prevail in Leicester, Bampton, Dorset Horn, Exmoor, Down, and cross-bred flocks, or which of them ?
12. Is it more fatal in one breed than another ?
13. Does it attack lambs in high or low condition, or indiscriminately in both ?
14. Does it attack them before or after shearing ?
15. Does it attack early lambs as much as late ?
16. Is it supposed to be caused by the animal having taken cold ?
17. Is it infectious ?
18. Has oilcake or other high feeding any preventive effect, or the reverse ?

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<sup>1</sup> To this Essay the prize of Thirty Pounds, offered by a Committee of Agriculturists in Cornwall, through the medium of the Bath and West of England Society, was awarded by LORD PORTMAN, the chosen adjudicator.

19. Have you any reason to suppose that the absence of water has caused the disease?

20. Or that shearing or dipping has caused the disease?

21. Does it affect lambs that have been sheared more than those that have not been sheared?

22. Are the farms on which you have known the disease prevail heavily stocked with sheep?

23. Are the sheep kept in large or small flocks?

24. In large or small fields?

25. Are they folded or not?

26. Are these farms high or low?

27. Wet or dry?

28. Underdrained or not?

29. Is the subsoil clay?

30. What is the geological formation of these farms respectively?

31. Does the disease prevail more on old pasture land than on artificial grasses, or *vice versa*?

32. Does it prevail on farms on which artificial manures are extensively used more than elsewhere?

33. Can you state any facts to show that it is caused by any particular species of clover, or at a particular period of its growth?

34. Does it prevail more in wet seasons than in dry, or *vice versa*?

35. Do you know any means of preventing the disease?

36. How should the symptoms be first treated?

37. Should the flock have access to water after the disease has shown itself?

38. Should they be generously fed?

39. Should they be kept in dry and warm situations?

40. Has any medicine or food been found to effect a cure, and what?

41. Are there any means known to you for destroying the parasites in the lungs after they have been developed there?

42. What do you believe to be the cause of the disease?

43. What its effect upon the animal?

44. State whatever theory you may have formed either for the prevention or cure of the disease, and the facts on which such theory rests.

The following is a tabulated analysis of the answers of the sixteen gentlemen who have responded to the questions sent to them. The number of the answer corresponds to that of the question; and when the numbers are not filled up, it is an indication that answers were not given, or that the author considered them indefinite. In some instances several questions are aggregated.

#### ANSWERS.

1, 2, 3, *Symptoms*?—Cough, debility, loss of appetite, after weaning, in July and August generally. Great prostration, purging, and thirst.

4. *Fatality*?—14 state, "always fatal in the last stages."

6, 7. *Morbid appearances and presence of worms*?—12 have seen worms in the windpipe and lungs; 1 has seen them passing through the stomach. The answers respecting morbid appearance unsatisfactory.

8. *Time of appearance*?—14 do not know.

9. *Cause or consequence*?—1 believes them to be the cause; 3 the consequence; and 12 give no opinion.

10, 11, 12. *Breeds and locality*?—4 believe all breeds equally liable; 3, Leicesters; 1, Dorsets; and 6, half-bred sheep.

13. *High or low condition*?—9 state low; 5 either high or low.

14. *Shearing*?—10 say after shearing, and 4 before and after.

15. *Early or late lambs*?—10 think early, and 4 the reverse.

16. *Cold*?—5 think that it causes or accelerates, and 6 believe otherwise.

17. *Infectious*?—7 think it is not communicable, and 3 that it is.



18. *Oil-cake and high feeding?*—13 believe these to be preventives, and none object to them.

19. *Absence of water?*—There are 14 negatives to this question.

20, 21. *Shearing and dipping?*—The answers to these questions are rather contradictory, but shearing is thought to be more prejudicial than dipping.

22. *Stocking?*—Nearly all agree that the farms are largely or heavily stocked.

23, 24. *Large or small flocks or fields?*—The flocks and fields generally small, but the disease is prevalent in both.

25. *Folding?*—In 12 generally not folded ; in 2 folded.

26. *High or dry?*—8 in both situations, 4 high, and 1 low.

27. *Wet or dry?*—6 dry, 5 wet or dry, and 2 wet.

28. *Underdrained or not?*—5 not drained, and 4 both drained and underdrained.

29, 30. *Geological formation?*—1 no clay ; 2 subsoil clay ; 3 clay, marl, and gravel ; 4 limestone ; 5 clay and bog ; 6 some clay ; 7 clay and slate ; 8 no clay ; 9 clay, slate, and granite ; 10 clay ; 11 clay, lime-rock, and gravel ; 12 some clay ; 13 chalk.

31. *Old pastures or artificial grasses?*—6 believe old pastures to be better than artificial grasses, 4 the reverse, and 2 think that there is no difference.

32. *Artificial manures?*—10 think that these have no effect.

33. *Clover?*—6 think not, and 6 answer as follows : 7 seldom so well in clover ; 8 yes, if in flower ; 9 Dutch flower partially seeded very injurious ; 10 ribbon-grass hurtful ; 11 Dutch clover in blossom very injurious ; 12 gay young clover bad.

34. *Wet or dry seasons?*—9 believe in wet seasons ; 2 in dry seasons, where food is short ; and 1 in both.

35. *Prevention and early treatment?*—1 early drenching ; 2 keep but few lambs together ; 3 arable land at night ; 4 linseed oil and turpentine ; 5 milk and treacle ; 6 put weak lambs in sheltered places ; 7 feed high and change often ; 8 keep few in large folds ; 9 high-feeding.

37. *Access to water?*—8 answer in the affirmative, and 5 in the negative.

38. *Generous diet?*—All are agreed upon this point.

39. *Dry and warm situation?*—All likewise agree in the necessity of this.

40, 41, 42, 43, 44. *Cause, effect, treatment, and theory?*—Under the head of cause are mentioned “want of nourishment after weaning, white Dutch clover, fresh-water species of parasite, and the disease taken from the ewe.”

*Treatment?*—2 recommend fumigation with sulphur, tar, and tobacco ; 1 Merrick's mixture ; 1 gaseous fluid ; 1 free access to rock-salt ; 1 salt and turpentine and oil ; and 4 recommend good feeding and no physic.

I now select from the answers of the 16 respondents such extracts as I think practical and useful.

#### *Cause, Prevention, and Treatment.*

“Two tablespoonfuls of linseed oil, and one of turpentine, in a spoonful of water, three mornings following, and to be given fasting ; or fumigation by burning sulphur, turpentine, and tar, in an air-tight house ; the lambs to be enclosed for 25 minutes, three successive mornings after fasting.”—ANONYMOUS.

“I should recommend fumigation with tar, sulphur, and tobacco.”—Mr GEORGE TUCKER, St Audries Farm, Bridgewater.

“Hot baths ; plugged them in the knee ; tried receipt from the ‘Royal Agricultural Journal,’ blistered them, &c. : but have lost 50 this year, and 70 about four years ago.”—Mr PORTER.

“I am not prepared to say it would prevent it, but if I had not given mine oil-cake, I am certain I should have lost all ; as it was, I lost 114 out of 190.—Last season the white clover was very plentiful, and I found my lambs soon showed symptoms of the disease after it came into flower.—My opinion is, that lambs of good constitution, taken care of from the time of being weaned, will



scarcely get it ; but if they get it, they should have the most generous living that can be given them, either in good meadow-land or clover after hay. I think seeds that have not been cut are the worst keep that they can have ; but I believe if they have the disease, and white turnips are large enough to draw, they are a certain cure. I never lost a lamb in 30 years after they ate white turnips.—Nearly 30 years ago I considerably increased my breeding flock. The first year I did so, nearly 100 out of 300 of my lambs died from the disease ; they were kept a good deal on the arable lands ; since then I have uniformly treated as in Answer 35, and they have never had the disease amongst them.—Dutch clover partially seeded is particularly injurious.—In dry seasons, when food is short, it mostly prevails.—35. Putting few together in pasture or mild meadow land, where few sheep have previously been kept, is the best preventive means.”—Mr T. DANGER, Huntstile, Bridgewater.

“If the animals are allowed to graze in low lands that are liable to cause the parasites, they should be removed to high arable fields in the evening, and allowed a small quantity of rape or vetches ; should it not be convenient to give these, they should be allowed at least half-a-pound of linseed cake or half-a-pint of crushed peas or beans, which counteract or destroy the said eggs, which are supposed to adhere to those grasses that grow in low lands, and are taken into the stomach of the sheep. They should never be allowed to remain in the wet pastures or meadow-lands by night, nor allowed to be put on the seed-lands early in the day, as the dews that are on the grasses at the early part of the day are favourable to the development or formation of the said eggs, &c.”—Mr BIRMINGHAM, Holnicote, Minehead.

“I think it necessary to have a change of food. After losing a large number, I removed from off seeds and saintfoin to turnips and rape ; gave oil-cake, and every other day drenched with linseed oil and a small quantity of turpentine, which had the effect of bringing away parasites and tapeworms.—Those attacked soon lost their wool, and never reached the weight of their fellows.”—Mr THOMAS BLISS, Witney, Oxfordshire.

“The cases which I have seen in my own immediate neighbourhood have satisfied me that the disease is caused by want of sufficient nourishment after weaning, the change being too great from losing the nourishment of the dam. Nineteen years since I lost 27 out of 60, caused entirely by being kept too long in the same pasture ; since which time I have never lost a lamb by that disease. I have always taken care to change the pasture, often three times a-week, and if the fields are small, change every day ; last year, Mr Gill of Inegasa, lost 38 out 100 by the same cause ; losses frequently occur in the locality, and can always be traced to the cause which I have stated. I have been my own shepherd for 25 years, and have given my particular attention to sheep generally.”—Mr P. O. DAVIS.

“Turpentine, not exceeding a tablespoonful, with about half-a-pint of strong salt and water to each lamb, three alternate mornings fasting ; repeated about a week, if necessary, or as long as the cough continues. These parasites being of a fresh-water species, the salt water and turpentine will so affect the whole system, particularly the lungs, through the blood, that if the constitution be sufficiently strong to bear the treatment, it will be sure to destroy (them) the parasites.”—Mr WILLIAM TRETHEWY, Tregoose, Probus.

“As I have said before, good keep and repeated change, and they should never lie two nights on the same spot. I never knew a suckling lamb have the disease, and my opinion is, that keeping lambs with the older sheep is in some measure a preventive after they have been taken from their mothers.”—Mr JOHN BEVISS.

“I believe feeding on Dutch clover, while in full blossom, is very injurious to lambs : I have found on most farms, where the disease was most fatal, that the lambs were kept on it. When we have a wet summer preceded by a dry spring, the mule grass or white Dutch clover is in abundance, and I have a strong conviction that this grass, when in full bloom, is destructive to young lambs if attacked with this disease. I had abundance of this grass last year in three fields,



measuring 15 acres, on which I kept 60 lambs, changing them every two or three days ; early, or about the middle of July, I found my lambs were not looking well, and within a week most of them broke out with the scour. I then took out my ewe lambs, and put them on red clover ; then all went right from that time, while the wether lambs all went wrong. I lost three of them in three days, and I believe that they would all have died had I not removed them into clover and old pasture land.”—Mr THOMAS ROSEBEARE, Wearde St Stephen’s, Saltash.

“After shearing, four years ago, we had a wet time ; immediately after the lambs were shorn, the lambs chilled, and I made sure they were preparing for the fatal disease ; rheum came over their nostrils with cough, but the disease took a different turn. The cough was natural, as from a common cold ; and the straining was not like that from the worms in the windpipe. I kept them on a dry sheltered piece of old grass, and they all recovered, and we saw nothing of the scour for that season.—The disease is less prevalent in old pasture lands than on clover, Italian rye-grass, eaver, vetches, or trifolium ; but still less on saintfoin.—I consider saintfoin the best food for lambs from June until they go into rape in the autumn. The lambs are infected before they go into rape and turnips, and if we can keep them healthy up to September, they are generally safe for the rest of the year.—I would by no means turn young lambs into a quick, gay piece of young clover, or any gay young food. I should prefer turning them into old pasture, although the food may not be so abundant. Old clover before it has seeded may do, but I much prefer saintfoin. If I have no saintfoin I divide my lambs into four flocks of about 80 each, and give them, if I can, eight old pasture fields for their run, changing each lot about twice a-week all round. I like to see a few horses and bullocks with them to eat up the grass the lambs do not relish.—Keep a strong flock, and purchase rams of strong constitution, not too fine. Manage to get the lambs early, at Christmas, and not later than the 1st of February. If possible, when weaned, keep them until September on ground that has not been stocked by other sheep. Let them always have water ; never allow them to be “dogged ;” and, more particularly in hot weather, keep them quiet.—I approve no medicine or pulling about by a veterinary surgeon, but removal from the rest into a large saintfoin field ; or if no saintfoin, into an old pasture field. I give them oats with bran.”—Mr R. B. WEEDON, Milverton Court.

*Remarks.*—There is, as might be expected, much discrepancy in some of the answers, as they relate to a disease about which so little is known. But there are some *practical* and *important* points upon which all nearly are agreed, namely, the necessity of *good* and *generous* diet—dry and warm situations—frequent change—the avoidance of overstocking—not feeding lambs where sheep have been fed before, and early and prompt treatment.

I think the labours of the Society have been fully requited by the disclosure of the above evidence, although a vast deal yet remains to be accomplished.

## 2. *Analysis of the Information obtained by the Author from Agriculturists, chiefly in the Eastern Counties of England, and from Foreign Sources.*

I now give the substance of the evidence I have obtained from various agriculturists, merely premising that I have made many inquiries respecting this disease during the last seven years, and had gathered some important information from flock-masters, chiefly in the East of England, before I saw the questions circulated by the Society. Since I obtained a copy of these questions I have forwarded them, or a part of them, with others added by myself, to large sheep-growers, for the purpose of obtaining information ; and I may remark that, as in the Eastern Counties the farms are generally larger than in the West, and sheep are kept in greater numbers, in this respect perhaps the answers are more satisfactory.

The letters I have received at present amount to thirty-five : five foreign communications ; eighteen that follow, and twelve to be named hereafter. Of the



eighteen following, ten are from Suffolk, three from Essex, two from Norfolk, one from Sussex, one from Bedfordshire, and one from Devonshire.

I quote such of the information obtained as I think bears especially upon the questions of Cause, Prevention, and Treatment. The answers received by the Society, which I have analysed, will enable me to shorten these abstracts, as I may state that there is a general concurrence as to the necessity of good feeding ; the avoidance of all depressing causes, of overstocking, and feeding lambs where sheep have been fed before ; and the adoption of early treatment, as stated at p. 106.

Mr G. M. SEXTON, Whersted Hall, Suffolk, tells me that he lost L.500 one year from the death of ram lambs alone, from this complaint :—

“It begins,” he says, “with a short husky cough and scouring ; the coat opens and looks dry ; eyes sunken and very white, and the lambs are almost bloodless before death.—I have generally found long, thin, white, threadlike worms in the lungs and windpipe of lambs, but never in sheep. I suppose these worms to be the cause of death, and the consequence of the disease.—My greatest losses have been where lambs have been highly fed on oil-cake ; the farms are, and have been, heavily stocked with sheep. My losses have likewise been great when the lambs were fed on white clover and trefoil, in highly-farmed land ; and when turned on too early in April, and fed closely ; the lambs having also oil-cake. When thickly stocked, and when the food has been allowed to shoot up again, and the lambs are turned into it a second time, they do badly.—Frequent changes, and *thin* stocking, I think, are the best preventives. I know of no efficient medicine, but I think coleworts or turnips with peas or beans the best treatment.—In the summer of 1861 I lost a large quantity of ram lambs ; they were fed, and their symptoms were as described in the foregoing answers.—The first time I observed the disease was on the 20th of July, two days before my annual ram-sale ; the lambs were then in high condition, many of them weighing from 13 lbs. to 16 lbs. a quarter ; a fortnight after this no one would have known them ; they coughed and scoured, and wasted much faster than they had grown and fattened. In a month I lost 45 ; the rest were sent a few miles off into a piece of coleworts ; seven died the first week, and after this I did not lose another ; about 70 of them had the run of a field of six acres, and, from the day they went in, they appeared to improve, but slowly. The sisters to these, the ewe lambs, lived all the summer in a park ; they were seldom or never changed, they had no artificial food, did remarkably well, and were very healthy.”

Mr FROST, Whearsted, Suffolk, says :—

“Many of my neighbours have been great losers by this complaint, but whenever I have observed symptoms of it I have endeavoured to move the lambs into fresh grounds, and I have as yet found this plan to be efficacious ; but not so with my neighbours.—I have known the disease to be worst in lands overstocked with sheep, and where lambs have been put in to feed that has been previously fed off by sheep, with an addition of artificial clover, and where sheep have laid very thick upon it ; in that case it is almost certain to kill the lambs.”

Mr STURGEON, South Ockendon Hall, Romford, Essex, a gentleman who farms largely, and who also buys a large number of animals for exportation, informs me :—

“We have been unfortunate enough to suffer for many years very severely from the disease of which you speak, so much so, that we have avoided the weaning of calves, and the lambs we are compelled to kill to make them pay, or they would be destroyed on the pastures here after the middle of July. We have tried cake and corn, but they will not prevent the disease ; dry food, and keeping them in until the grass is dry, are the only preventives. Nothing will cure the complaint when fully established ; but I have known the remnant of a lot taken to another place, and those that were unaffected, do well. I recollect buying a lot of thirty calves (good short-horns nearly a year old), that were left out of a lot of fifty, the others having died of the disease. I shut them up in a yard, fed them well, and most of them recovered. I believe the disease is occasioned by something they



pick up in the grass. We have always found worms in the windpipe, like thread, and the small tubes of the lungs are choked up with them. I believe they are the cause of the disease, and good food will not prevent it if the animals are kept in the *same pasture*: nothing will do but change. Our animals do well on the same land, when it has been ploughed and worked about, and afterwards sown with clover. The most relief I have found in the way of medicine is from spirits of turpentine, which I have sometimes poured down the nostrils.—Lambs and calves are affected exactly in the same way, and on the same land.”

Mr KERSY COOPER, Euston, Suffolk, writes thus:—

“I have always found worms in the windpipe, and, in the advanced stage of the disease, in the lungs.—I consider the parasites to be the effect, and not the cause. Nutritious diet is desirable and necessary, but I question if oil-cake is the proper food. I have given rice-bran and decorticated cotton-cake with advantage.—In every case that has come under my notice where this disease has prevailed, the farm has been heavily stocked with sheep, and the permanent pastures principally fed off by them.—I consider white clover, after having been fed down close, and allowed to grow into blossom before turning sheep into it, is liable to produce the disease.—I have also had it produced from feeding on a permanent pasture too long without a change, and from allowing sheep to drink stagnant water in hot weather. I have seen a whole flock of ewes and lambs attacked in consequence of this.—The most practical remedy I have met with, is putting the lambs on good coleseed or rape-seed, when they are in their luxuriance of growth. I have entirely stopped the disease by this change, and it has been more or less successful in every case where I have recommended it.—The lambs should be fed judiciously, rather than generously; food of a stringent nature I consider better than that having a laxative property.—I have used turpentine and sweet-oil (or linseed-oil) in equal parts, a dessert-spoonful each day to a sheep, with great success. I believe it has killed all the worms within its reach, as I have found worms after death in the stomach-passage. It either released the worms that were deposited or destroyed them. I have made complete cures by adopting this course in the early stage of the disease, and in a later stage have relieved the animals so that they showed a more healthy appearance.”

Mr THOMAS ELLMAN, Beddingham, Sussex, a celebrated breeder of sheep, remarks:—

“Not having been troubled with parasites in my flock, I have had little or no experience in the matter. My lambs once had a cough in the latter end of summer; I lost a few of them, but as soon as I moved them from a wet situation to a high and dry neighbourhood (some miles distant) they recovered and thrived. If I were annoyed with this complaint again, I should administer oil of turpentine and sulphate of iron.”

Mr R. BOND, Ipswich, Suffolk, says:—

“I have always found parasites in the lungs, and the feeding of lambs upon grass with heavy dew upon it always appeared to me to produce the disease. I believe that it prevails more in old pastures than in artificial grasses. Good feeding I believe to be the best preventive.”

Mr CHARLES BOBY, Stutton, Suffolk, who has seen much of the disease, in his own flock and elsewhere, has furnished the following information:—

“I do not know if they (the parasites) are the cause or the consequence of the disease; they appear to act precisely as the fluke does in what we call the rot in sheep; the veins inside the eyelids are bloodless, the lips livid, very similar to the appearance of rot from feeding on unsound ground.—All breeds are alike subject to it. It is equally fatal to the Half-bred as to the Down, and I do not think the condition of the lamb has anything to do with it.—I am writing of lambs sixteen or eighteen weeks old; they are never shorn in Suffolk.—I was feeding my lambs with oil-cake when they were first attacked; I lost 160 of them. The second time I did not give the cake, I lost about the same number. I have lost none since.—I am not aware that any particular sort of clover affects



the sheep. It arises, in my opinion, from putting the lambs on the second growth of the clover, where it has been heavily fed in the spring, and consequently manured by the sheep; the food grows rapidly after rain in the furrows, and where most manure is laid in the previous feeding. This, I believe, is the secret of the disease.—In dry seasons we feed very close, and after rain the growth is very rapid. The two seasons in which I lost my lambs were moderately wet.—We have always found the best plan is to put them on coleseed directly. I believe turnips, or any succulent keep, will do; an improvement appears in the animals almost immediately. I think the worms pass off with the looseness of the bowels caused by eating the coleseed.—I have never heard of medicine doing any good.—I have come to the conclusion that it is caused by lambs feeding (old sheep take no harm) on old ground. I have permitted this myself and felt the effects, and my opinion is also strengthened by the following circumstance:—In June 1861, I sold Mr Boggis of Wix, 200 of my lambs, keeping back 200 for myself. During conversation he remarked that he should put them on a capital piece of second-crop clover. I inquired immediately if it had been fed off? He said “Yes, giving the sheep cake.” I cautioned him not to put the lambs on it; and when my shepherd delivered them, he also told him the consequence of doing so. The result was that in about a month a great many of them began to die, and he eventually sold them for the best price he could get. The remaining 200 which I kept, were perfectly sound.”

Mr WOLTON, Kesgrave, Suffolk, says:—

“In 1859 I had a heavy loss through this disease, and since then I have guarded against it, as described, with good results.—There are always some worms in the lungs or windpipe, which appear to extract the nourishment or blood from the system, as the carcass is almost without blood when the animal is near death.—I cannot say that worms are present in every case; still it is my belief they always exist: they are as fine as hairs, and vary in length.—My lambing season commences on the 15th of March, and the early as well as the late lambs have suffered. As regards prevention, keeping the lambs strong is a great means towards avoiding the disease, and I have found a good piece of rape, with a quarter of a pound of the best linseed-cake per lamb per day a great help towards their recovery, and since mine have been fed in this way, I have avoided the fatality of the disease.—I believe the complaint to be most prevalent where the sheep fodder much, whether old pasture or artificial grasses; change of diet, where sheep have not been fed before, is very desirable.—Overstocking and too close folding are fruitful sources of the complaint.—I always find that the more thriftily my lambs are kept, and the greater variety they have, the better they thrive and maintain health.”

Mr M. BIDDELL, Playford, Suffolk, a near neighbour of the last-mentioned correspondent, replies:—

“I have looked over the questions and answers, and quite agree with you except in one answer.—I have not always discovered worms, but always found the body nearly without blood after death. As regards the cause or consequence I am uncertain, as I have seen worms in the windpipes of lambs that I believe have died from other causes. The disease prevails both on high and low situations, and in early as well as in late lambs. I have only seen the complaint in *lambs*; diseased lambs may safely be put with sound, provided the feeding-ground is changed.—The lambs appear to want all the good food that they can be induced to eat. I have heard of cases where the disease has been stopped by feeding on colesced, a kind of food they cannot stand if they are in health.—I believe the disease, or rather the development of it, to be caused by feeding on young and innutritious green foods, such as that grown from highly-manured meadows or clovers, which sheep will never eat if they can get other food. Old sheep will not take this disease, if so fed, but they will not thrive upon it. I fancy that the eggs of the worms are eaten with the food, and that the lambs cannot digest them, or destroy them; but old sheep will, or why should sheep and lambs feed and keep together, and only the lambs take the disease? I don't know that the worms



come from eggs, but I cannot see how they get into the lungs except by being eaten with the food."

Mr FREDERICK EDWARDS, Barnham, Suffolk, writes :—

"I know one person farming cold pasture-land who lost 200 lambs; they dwindled away as if in consumption; sometimes they had violent scouring. Another instance occurred on a farm adjoining mine, where the soil is very light and the land is always considered healthy, but a portion of the sheep-walk is cold and low, and rather moist, yet I never knew sheep rotted upon it. This person lost but very few lambs this year (1862), but a great number last year (1861); they died off gradually, and had very little blood in them when opened.—On my farm I lost a few last year and also this, and many of the lambs had an unhealthy cough, as if their lungs were tender.—Lambs have been bought by dealers and returned on account of the disease, which appears not to be understood."

Mr HUGH AYLMER, West Dereham, Norfolk, a well-known breeder of sheep, furnishes the subjoined information :—

"I will now reply to your questions to the best of my ability; you must excuse all technical terms, having drawn them in language as plain as possible. Keeping as I do from 50 to 60 score of long-woolled sheep, I have had some little practical experience, having from my boyhood given my time to the study of sheep and the breeding and rearing of rams.—Worms are generally found in the windpipe of lambs in the first stage of the complaint, and if neglected, the lungs become affected with them.—Worms in the windpipe, I have no doubt, are caused by the unhealthy state of the food, produced by soiling the flock on the lands, climate and atmospheric influences aiding.—I have no doubt that feeding on fresh ground, with a moderate supply of corn or cake, with a lump of rock-salt to run to, are preventives.—When the disease has appeared it has generally been on farms heavily stocked with sheep, and it has been for the want of fresh feeding generally that the lambs have become diseased.—I have always seen, where the lambs became unhealthy, that it was caused by their feeding on lands where ewes and lambs had previously been fed in the early part of the summer: consequently the land has been freely soiled with the sheep. When the rain comes in June and July, it causes the grass to grow luxuriantly, the acidity of which weakens the stomach and lays the foundation of the disease. To prevent this, the lambs, as soon as they are taken from the ewes, should be kept on fresh land, such as artificial and grass eddishes, green tares, saintfoin, coleworts, &c. &c.: the more change the better, and they should be generously fed.—I have found the following recipe very beneficial in some cases. A few years since, Mr J. Hudson of Castle Acre, Norfolk, had a large lot of very good lambs with the disease. I had lost a large number, when I gave him the recipe, and they all recovered :—

"Epsom salts 6 oz., nitre 4 oz., boiling-water 3 pints; when milk-warm add 4 oz. of spirits of turpentine, and bole ammoniac in powder  $\frac{1}{2}$  oz.; mix well, and give from three to four tablespoonfuls every other day."

The effect of this complaint upon the animal is, that when the disease has gained the ascendancy, the lambs scarcely ever recover; if they do, they never make strong, muscular sheep. My opinion, both practical and theoretical, is this: if the plan of feeding which I suggest be adopted, there will be no fear of the disease."

*(To be continued.)*

## ON WEED IN HORSES.

By JAMES M'GILLIVRAY, V.S., Rayne, Inch, Aberdeenshire.

[Premium—The Gold Medal.]

## I.—INTRODUCTORY REMARKS.

EXCEPTING colics and diseases of the respiratory organs in the horse, no disease has occurred so frequently in my practice as the disease called “weed.” Country people, I presume, from its two most prominent symptoms—suddenness of attack and a swollen leg—have named it “*a shot of grease*.”

In writing the following report, it will be understood that my object is to avoid as much as possible the technicalities used by the profession. I am not writing for the purpose of conveying instruction to professional gentlemen; I am simply to give the results of my experience and observation on the disease in question for the benefit of the farmer, the owner of horses; and this more for the everyday guidance in the right and proper management of his horses—in conducting, by their means, many of the most important operations in agriculture, and thus avoiding causes of disease—than with the hope of enabling him to treat them successfully while under its action. Although an attack of the disease called weed very rarely proves fatal, still the farmer looks with dismay when told that a valuable animal in his stock is affected with this disease. Generally he knows that there are two risks attending this attack; first, an animal once affected with weed is very likely to have repetitions of the attack; second, if the affected animal be not actively and properly treated professionally, and unremitting attention paid by those in charge, there is every reason to apprehend a permanently thickened leg, and the animal blemished for life—such blemish deducting half the value of any animal if offered for sale. Most other diseases to which horses are liable leave no blemish; once the disease is removed, it can scarcely be told that the animal has been ill; but in many attacks of weed this is not the case.

In writing out the following report, I have given—first, “the symptoms;” second, the *post-mortem* appearances,” also symptoms; then “the nature of the disease” as deduced from the symptoms, &c.; I have classed “the causes remote and proximate” along with “the *preventive measures*,” as in this peculiar affection the *causes* and *prevention* are naturally so mixed together—so inseparable in discussion—that to have given a separate chapter for each would have necessitated so many repetitions as to add considerably to the length of the report, and, to my mind, it would not, after all, have been so coherent, so easy of comprehension, as on the plan adopted; and lastly, I have given the treatment pursued by myself, which in an extensive practice I have found the most successful.

## II.—SYMPTOMS OF WEED.

A horse suffering from an attack of this disease generally presents to the observer two special indications; first, diffuse, *constitutional*; second, circumscribed, *local*. The first is in all cases apparent; the second may not always be apparent, but, I am convinced, is in every true attack of weed. The first, diffuse, is indicated by laborious breathing, a rigor or shaking-fit, distended nostrils, profuse perspiration, conjunctiva and membranes of the nostrils red, inflamed, highly injected—extreme restlessness, ears dangling, the appetite gone, and pulse from 90 to 110. The second, or local, is indicated by the animal standing on three legs; the other leg, useless for the time, cannot be put to the ground so as to support any of the animal's weight. On a superficial examination of this limb an enlargement is found inside the thigh—in the female, at a spot almost opposite the mammæ or udder; in the male, opposite the scrotum. This enlargement is very hot, irregular to the feel on the surface, extremely tender and painful, and generally covered with perspiration. The scientific anatomical examination of



the carcase of the horse exhibits three classes of vessels ramifying through and pervading every part of the body. One of these sets of vessels collects the blood from every part of the body, and pours it into the heart; the second set of vessels conveys the blood from the heart to every part of the body, for the express purpose of building up its wasting substance and renovating its exhausted tissues; the third system of vessels contains a colourless fluid named lymph; and this set of vessels are termed lymphatics. Wherever necessary, there are always two groups of these vessels—a superficial and a deep-seated—the superficial generally accompanying the larger veins; the deep-seated take the same course as the large arterial trunks. The commencement of the lymphatic vessels are of the capillary nature, but not small; a pair of good eyes can see them without assistance. They are so much larger than the capillaries of the blood-vessels, that these last are found ramifying on the parietes of the former. These lymphatic vessels are thickly distributed through and over the skin, and indeed are in every part of the body. They are the principal agents in producing absorption when any substance, such as a blister, or any preparation of mercury, &c., is applied externally to the surface of the body. The commencing extremities of the lymphatics are said to be shut, so that the entrance of any fluid into them is by imbibition—endosmotic action. Within every living body there must be a constant disintegration of the various parts of such body, of course varying with the nature and economy of the special part. Possibly this waste of substance is partly due to the tissue-destroying action of oxygen; still the disintegrated substances of the tissues will not be altogether thrown out of the body; such a proceeding would argue prodigality, and would not be in harmony with the known general economy of nature. There may be portions of it capable of reassimilation, for the purpose of repairing the waste of other parts of the body. To accomplish this end the lymphatic vessels of the posterior extremities convey all their contents into another large vessel or sac; the general contents of this sac are supplied from both lacteal and lymphatic sources; this large sac can be very easily seen passing from about the posterior portion of the mesenteric artery forward between the large posterior vein named the *vena cava* and the posterior artery, which, in the horse, is always on the right side of the vertebræ or back-bone. This sac terminates in the thoracic duct, which pours the collected contents of the lymphatics and lacteals generally into the left jugular vein, whence, along with the venous blood, they are sent by the heart into the lungs for purification, then returned to the other side of the heart, and by its impulsive force sent to every part of the body for the accomplishment of the purpose already mentioned. The healthy function of the whole lymphatic system is to convey into the general arterial system those materials that are capable of absorption, whether such materials have an internal or external origin. The lymphatic vessels now referred to are furnished with valves of semilunar shape, and opening in the direction of the heart, thus indicating at once the direction of their contained currents. In addition to the valves with which the vessels now described are furnished, they pass into, or are formed into numerous bodies called glands. The structures of glands have been minutely ascertained and pointed out by several of our best physiologists. I myself have minutely examined portions of glands with very high magnifying powers, but could detect nothing in their structure different from the beautiful diagrams of glands given in Dr Carpenter's "Physiology." The specific action of glands, however, is not known, not being indicated by any specialty in their construction or physiological arrangement in their substance. These glands are very numerous at the spot where I have stated the enlargement is to be found in this disease; and, being situated in the inguinal region, they are termed the inguinal glands.

Inflammation of the glands last mentioned is the first special symptom of weed. When they become inflamed there is a stoppage of the lymph, either partial or complete, at the precise spot where the containing vessels enter the gland. As time passes on and the disease progresses, the accumulating lymph increases the inflammatory action by unduly distending the lymphatic vessels; consequently the swelling increases and gradually extends itself downwards over the affected



limb. Nothing is being removed from the limb, in so far as the effete, worn-out, or unnecessary matter is concerned, so that the diseased limb may, in that respect, be considered for the time as foreign to the body.

At times all the constitutional symptoms will disappear and the local ones remain: the affected limb refuses to respond to treatment, and the local symptoms become daily more and more aggravated; the leg is becoming larger, stiffer, and more painful; peculiar swellings by-and-by present themselves, commonly about or in the neighbourhood of joints; these swellings, increasing in size, point and burst, leaving ill-conditioned, ugly sores, often directly opposite to important joints. Still I never knew a single case in which the capsular ligament of a joint was penetrated by these sores, the joint never being injured in the least, however bad-looking the local symptoms were, and on recovery of the limb the joints were always sound and supple.

A limb enlarged and swollen by weed presents another symptom—the swelling is much reduced by exercise. This is due to the fact that, in exercising the animal, the muscles of the limb are necessarily alternately contracted and expanded in volume, thereby pressing on and forcibly contracting the lymphatic vessels, the valves of which compel the contents to take the proper direction, and this promotes absorption and the reduction of the leg.

### III.—POST-MORTEM APPEARANCES.

I am not certain of ever having seen the carcase of a horse that died from the effects of weed without its being accompanied with some other disease. I have known old and valueless horses that, when severely affected with weed, were sent to the tanyard to be destroyed, &c.; these I have seen. It was my fortune to reside for years in the immediate neighbourhood of a tannery. A very small consideration to the men employed there gave me the privilege of examining every carcase that I expected to learn anything from, or wished to inspect, &c. On reference to my book, I find a *post-mortem* examination of a mare that died from the effects of weed, &c. The disease was more particularly in the right hind-extremity, and, on carefully laying open the affected limb, I found the muscles diminished in size, but otherwise in a healthy state, or nearly so, well coloured, and firm. I found between the muscles and in the subcutaneous tissues—more especially in the areola of these tissues—an enormous deposit of semi-organised coagulable lymph. This deposit was mixed up with a large quantity of thick, yellow, fatty matter; the lymphatic vessels scarcely to be distinguished from the above mass of coagulable lymph and fatty matter; the blood-vessels, both arteries and veins, all pervious and right. The arteries contained very little blood. The veins and right side of the heart were quite full of blood, and in these vessels the contained blood presented much the same appearance as it does when abstracted from the animal in life. The coloured portion of this blood was separated from the buffy coat which stood above (in relation to the side the dead animal lay upon), was also almost colourless, and had the complete shape of the containing vessels. The glands were so much decomposed as to present little but a putrid mass. Very much of the deposit above mentioned was lodged about the joints, especially the stifle joint. There was nothing wrong about the bone; the periosteum was not discoloured; neither were the cartilages removed from the extremities of bones. Previous to death there were several ulcerous sores opening externally; these were inside and outside the thigh, about the line of the stifle joint, across. Some of these ulcers had burst naturally, and some of them, being likely to burst, were opened by the veterinary surgeon in attendance. The limb was enormously enlarged; I should say three times the size of the healthy one. Internally there was nothing particular to note; contents of the chest healthy—just the appearance of animals that die from the irritation and exhaustion consequent on continued low fever. This mare had a foal twenty-six days before death—a malformation. Severe parturition was the consequence. For ten days subsequent to the parturition she did no work; had fair appetite, perhaps rather delicate, as



the milk gave her some trouble: then came the attack of weed, presenting the common symptoms.

In making *post-mortem* examinations, I have met with serum in considerable quantities in the abdomen; also large deposits of coagulable lymph on the mesentery, about the kidneys and walls of the abdomen, and viscera, &c. This deposit, when removed, took along with it the peritoneal covering, and thus left the viscera, walls, &c., in such a state as to preclude any definite conception of the real state of the parts previous to the animal's death.

#### IV.—NATURE OF WEED.

From the symptoms now detailed, it will be plain that the disease under consideration is in its nature inflammatory; that it is characterised by constitutional fever; that there is also a local affection more or less apparent, but sufficiently common to stamp this disease with its own specialty; that this affection is essentially a disease of the lymphatic system; is undoubtedly due to high feeding, irregular exercise, unsteady or deficient work: that there is also a hereditary tendency to it which may descend from sire to son, &c.; that under the above management, or rather mismanagement, horses having this hereditary tendency are more liable to become affected than others; that wherever this disease occurs, there is in the affected animal a disproportion between the nutritive aliment thrown into the body and the assimilative or excretory powers of the system.

It may, in all fairness, be characterised as inflammatory, febrile, and congestive. It is not a fatal disease, but yields readily to rational and scientific treatment; constitutional in common, but in some particular cases requiring local depletion by means of rowells, setons, &c.; and, in a few extreme cases, works out its own cure by the spontaneous breaking up of the diseased tissues in the shape of ulcers, these ulcers having a prolonged and copious discharge.

Under many circumstances I have examined blood in its varied forms taken from horses suffering from weed, often with very high magnifying powers; and now, while writing these observations, I have, at my own premises, had an opportunity of taking blood from an affected horse. I have just allowed a single drop to fall from his neck and spread on the field of the microscope, examining it as a transparent object before it is three minutes from the circulation. The colouring corpuscles are quite distinct so long as the film is not dry—they instantly group together in irregular masses. As soon as the film is dry, the coloured masses remain visible, but the corpuscles are scarcely distinguishable. The thin film of colourless matter between contains a few colourless corpuscles, extremely small, and but a few are visible even with very high powers. Independently of individual gravity, the coloured corpuscles have an attraction for each other, and thus they are congregated into masses. Very likely these masses are heavier than the surrounding media—fibrin, albuminose, serum, &c., and may thus descend in the vessel by their own special gravity. This tendency to congregate in groups is augmented, to all appearance, in inflammation—is it a cause or a consequence?

It is certain that an important alteration has taken place in the blood of every horse suffering from weed. In blood abstracted from such animals, I have always found a great tendency of the coloured corpuscles to separate from its other constituents, and sink to the bottom of the vessel it may be received into, thus leaving a large portion as buffy coat. This buffy coat often amounts to more than half the quantity abstracted. The mass at the bottom of the vessel is always black in colour, has very little coherence, and is a soft, tremulous, jelly-like substance. The other part, the buffy coat, is deeply cupped, and only very moderately firm in texture. The cupping is due to the circumstance that, while cooling, the mass adheres to the sides of the containing vessel, contracts in volume during coagulation, being more dense then than in the fluid state, and from these conditions it must sink in the middle.



We have seen that this separation of the colouring matter from that which forms the buffy coat, is not altogether due to the greater gravity of the coloured portion ; and farther proof is, if a single drop of blood from the neck of the affected animal be allowed to fall on the sloping side of the receiving vessel, and spread as thinly out as possible, the colouring matter (corpuscles) will instantly arrange themselves into groups, leaving the colourless portion a thin film on the vessel, &c. ; and this fact is obvious to the unassisted sight. I have observed these circumstances in every case of weed. I have abstracted blood from horses within two hours from the commencement of attack, during the shaking or cold stage. From these circumstances, I am convinced that, previous to the attack, there exists a derangement amongst the elements, their nature or proportions, of which the blood is composed.

From frequent examinations and observations, I conclude that the extreme and constant tendency to separation amongst the elements of the blood is an unhealthy abnormal state, the bad effects of which will soon manifest themselves in any animal body where such a state exists.

In this disease the albumen seems to be superabundant in quantity for the maintenance of perfect health. It is well known to physiologists that there is not a demonstrable step between health and disease. An inordinate extreme healthy action gives rise to or merges in disease, and I more than suspect that this is the origin of weed. Perhaps the albumen exists in the blood in that state called, by M. Mialhe and others, *albuminose*—imperfect albumen—in moderate quantities adapted for nutrition. In this state—said to be very deficient in organic compounds—and while the walls of the blood capillaries are impervious to albumen *proper*, this *albuminose* copiously transudes the walls of the vessels, passing into the surrounding tissues in quantities too large for the requirements of the body, or for its ordinary powers of absorption ; and from the tendency to permanent enlargement exhibited by limbs affected with weed, I apprehend there must be a proportion of fibrine exuded from the blood capillaries along with the albuminose. In other words, these matters, when effused in such quantities and in unhealthy proportions, although still the elements of proper tissues, yet, under the circumstances, very soon acquiring too low powers of vitality for healthy organisation, are only fit for forming abnormal organisations, or to be expelled from the body, thereby overtaxing the absorbent powers of the lymphatic system ; and these not being equal to its removal, its presence produces irritation, inflammation, fever, congestion, enlargement, ulceration, and the consequent death of particular tissues, and at special points of the affected limb. Of course, if nature be properly supported and assisted, resolution may, and generally does, take place, and the affected limb is restored sound as the others.

#### V.—CAUSES AND PREVENTION.

From many years' extensive practice, and the privilege of having attended and carefully noted the apparent remote and proximate causes, symptoms, progress, and results of many hundred cases of weed in the horse, I am convinced that the disease is incidental to certain conditions arising out of, and accompanying, the domesticated state, the artificial treatment to which the horse is subjected ; also, that certain forms of horses are more apt to be affected under the same circumstances. Experience and observation prove that horses living and working under certain known circumstances are almost completely exempted from attacks of weed ; while it is equally clear and known that the same stamp of horses, brought under other circumstances, are affected with this disease. Thus we are forced to the conclusion, that the conditions under which the animals are kept, and the daily treatment they are subjected to, have much to do with the appearance or non-appearance of weed.

The doctrine of prevention being a dark subject, the only ground on which it can be rationally and usefully discussed is the strict and careful examination, and consequent elucidation, of the conditions, circumstances, and their effects now



referred to. Proceeding on the above data, I am convinced that three things contribute to produce this disease. Cause first : A high state of feeding, by which an extra quantity of rich and nourishing matters are thrown into the animal system. In such cases the absorbents, lymphatics, &c., are generally overtasked ; their functional operations and powers are inadequate to the labour of removing the superabundant matters altogether from the animal body, or conveying them, as is done naturally, from one part of the body where they are not required to any other part of the same body where they are needed. Cause second : An abridgment or total cessation of the customary work or exercise to which the animal is subjected. Moderate work or exercise is not only salutary in its effects, but is absolutely essential to the preservation of a healthy state of the body of all animals. Exercise assists in promoting digestion ; also in eliminating from the body much of the effete, worn-out matters, in the shape of sensible and insensible perspiration. Moreover, the action of the muscles, that must of necessity accompany exercise, certainly does assist the lymphatic vessels in propelling their contents more rapidly in the proper direction. I have observed that horses which are moderately and uniformly tasked, and at the same time supplied with wholesome food and good water, always the same quantity and at regular intervals, are very rarely affected with weed. For many years I had under my care four relays of four horses each. These horses were employed in dragging a mail coach the regular stages for seven days a-week. Their work was smart but very regular ; their food, corn and hay, of excellent quality, supplied at certain well-known hours, and amongst these horses I never had a single case of *weed*. Again, in the same village, the centre of my professional operations, there were a good few common carriers employing many horses on the road. These horses were very highly kept, their work was very irregular—long pulls of forty miles with heavy loads, then idle, or next to idle, for some days. Nothing was more common than for some of these carriers to put me out of bed on the Monday mornings to attend some of their horses under an attack of weed, the high keep and the Sabbath-day's rest being the means of inducing the attack.

Among farm-horses it is very rare that a case of weed occurs during the busy season of spring, unless there come some unseasonable weather so as to interrupt all farming operations, and also between the Sundays and Mondays. Under these conditions the farmer well knows the frequency with which his horses have attacks of weed. Now, I know that farmers cannot enter into field operations in stormy and bad weather, neither can they work their horses on Sundays ; but, under all these circumstances, they can give them plenty of exercise and restrict their quantity of food. So far as I am concerned, it is well known that for years I have advocated the subjoined plan of treatment :—"On the Sabbath morning, or the morning of any day the horses are to be idle, at the customary hour in the morning give the common quantity of food ; at the hour when the horses are generally put to work, turn them round in the stall, or tie up their heads, so that they cannot eat anything until the hour at which they commonly come from work ; and during these yoking hours give them one hour's smart exercise—one hour's quick trotting being equal to four hours' field labour. If the season be one for two yokings, then act as above twice a-day ; and if circumstances be such as that exercise cannot be given to the horses, then withhold part of the ordinary rich keep, &c." These simple injunctions being attended to, I am quite confident that few cases of weed would appear.

Strangely enough, since the above was written, several circumstances have occurred confirming the principles advocated. In the present season the harvest is unusually late. For one month preceding the commencement of harvest operations, horse-work was about *nil*. Farm-horses have been all but idle for the last six weeks. For one month previous to this date, 6th October 1862, I have had a greater number of cases of weed in the horse than I had in all the preceding eighteen months. On one day I had four fresh cases of weed—three occurring on one farm. In many cases horses have lately been largely supplied with green tares mixed with corn fresh from the field ; the corn is now ripening fast, and I



have no doubt the corn and tares are at present a very rich and nutritious food, and, coupled with the absence of work, very likely to assist in producing such a state of the circulation as is the antecedent of weed.

Horses employed for conveying gentlemen's carriages, &c., are not so liable to become affected with weed as are horses employed at farm-work. There are two reasons for this: First, the breeds generally employed as carriage-horses are not naturally so subject to attacks of weed as are the more clumsily formed horses used for slow work; secondly, Horses employed for agricultural operations are neither so uniformly wrought or so regularly exercised as are carriage-horses. Confirmatory of these principles is the fact, well known to many, that a horse suffering from weed, if able to travel at all, if compelled to leave the stable and take even a little exercise, will get much sooner better, even taking into account the severity of the attack, than one that is allowed to mope about in the stable, with little exercise, and few attempts made to take him out.

Cause third: There is the selection of horses to breed from. Even amongst the so-called farm-horses there is a natural variety. I firmly believe that certain *forms* of horses are more liable to attacks of weed than are horses having other and different forms. It would be rather out of place here were I to enter at any length into a detailed description of the various forms of horses to be met with in a country practice. I shall only give a short extract on the point in question from the celebrated work on the horse by Blaine, as I have met with nothing better adapted, &c. "The knee of the horse, like the joints generally, should be large, by which the surface of muscular and ligamentous contact becomes increased, and the stability of the limb in proportion augmented; by this form, also, the tendinous insertions are farther removed from the centre of motion, and thereby their power is increased. The canon or shank follows the *knee* or *hock*, and the perfection of its form throughout is important, as here there are no fleshy masses, but purely tendinous matter; and, as the bone itself is sufficiently solid, so it is not the circumference, but the *breadth* of the part that is requisite to form a *good shank*. The tendons themselves, which are the *back sinews* of horsemen, should continue broad downwards, forming a surface of great lateral width, but which should be thin posteriorly; the mass of sinew itself should, however, be considerable, and very firm." When these tendons and their coverings are swelled, and rounded, as it were, into one mass with the bone, leaving no distinctive marks between the one and the other, either there is, of these parts, a *bad conformation naturally*, or they have been sprained, or most likely there may have been repeated attacks of weed, leaving the limb with an unsightly and permanent thickening, and, of course, very subject to renewed attacks of weed.

The circumstances now detailed are partially known amongst farmers. There is also an impression current, that if a mare having a tendency to attacks of weed do become pregnant, have a foal, and suckle the same, she—the mother—will by these means be cured of her constitutional tendency to attacks of weed. I must confess, however, that I have not collected data sufficient to enable me to say if this *is* or *is not* correct; but I am pretty certain that, in seven cases out of ten, foals produced and reared under such circumstances will have the unenviable distinction of being constitutionally and physically inclined to weed; and, to look at, clumsy, and for work, will prove actionless brutes. From a consideration of these circumstances, the breeder of horses will see the necessity of exercising great care and skill in the selection of animals to breed from, as very much depends on the nature and constitutional peculiarities of a stock, both for comfort and profit afterwards.

*Prevention by Medicine.*—I have made direct experiments with common nitre, by allowing a portion of blood from a horse's neck to flow into a weak solution of nitre, and from the same wound taken another portion of the same blood into a second vessel without the nitre. The nitre did prevent the coagulation of the fibrin and the grouping together of the colouring corpuscles of the blood, preventing the separation of the blood elements. However, we possess no certainty that nitre has the same effect when introduced into the active circulation of the



living animal. Still I find it always acts on the kidneys, and by increasing their activity, becomes a valuable agent in eliminating from the body much of the worn-out matters, &c. The farmer would give with advantage to every horse a half-ounce dose of nitre in soft meat every night for a week at one time. This might act as a preventive of weed, especially when horses are idle. And the following course of six doses could be repeated, allowing one week to pass between :—

R Nit. pot.,	.	.	.	.	℥ iij.
Flor. sulph.,	.	.	.	.	℥ j.ss.

Mix, and divide into six equal parts, one every night, as above.

#### VI.—THE TREATMENT OF WEED.

The presence of a majority of the symptoms already detailed will make an attack of weed apparent and certain. A physic ball should be administered at once, unless the affected animal may have been labouring under any other disease which precludes the use of depletive measures, such as colds, strangles, influenza, &c. The horse affected with weed, and free from other diseases, should have a ball composed of

R B. B. aloes,	.	.	.	.	℥ vij.
Calomel,	.	.	.	.	℥ j.
Ginger pulv.,	.	.	.	.	℥ j.

Mix and make up with spirits of wine. I give the preference to spirits over any other substance for the purpose of forming an aloetic ball. I do so for this reason : the aloes is a *gum resin*—*i.e.*, composed partly of gum and partly of resin—and, if the ball is made up with lard or palm-oil, as is commonly done, then the resin has no proper solvent menstruum, perhaps not in the stomach of the horse ; but if the ball is formed with spirits, the resin is at once dissolved, and the gum portion of the ball will be dissolved in the fluids of the stomach. The horse having got the ball, should have plenty of exercise up to the time that the ball commences to operate—generally from twenty-two to thirty hours. Immediately after the administration of the ball, take from three to five quarts of blood from the neck. I do not approve of bleeding from the affected limb ; in such cases it is always taken from one of the larger veins, and, after all, is only blood taken from the general circulation ; it is no real local blood-letting, and can, consequently, have no advantage over the same quantity abstracted from the neck. I have seen bad consequences follow the abstraction of blood from the saphena vein—the large and prominent vein on the inside of the thigh, or the plate vein, inside the forearm, &c.

Fomenting the tumified limb with very warm water does much good, if only persevered with. It relaxes the vessels, encourages perspiration, a freer circulation, and, in some degree, restores the deficient absorption. By these means relief is given to the pain and stiffness. Gentle exercise also should be given, increasing its smartness as the animal can bear it.

During the action of the physic, however, the animal should not be moved out of the stall—about twelve motions is considered sufficient. After the operation of the purge is fairly over, the animal should have plenty of exercise or light work. During work the swollen limb is generally much reduced in size. Should it fill up during rest, or during night, then a flannel bandage, 6 feet long and 4 inches wide, should be got and applied to the affected leg when it is reduced by exercise to its smallest dimensions. Of course, the application of the bandage commences at the pastern, and is continued very tightly up the leg, &c. ; this bandage to be removed before the animal is put to exercise or work. Should there be a tendency to swell in the rest of the limbs, which is not uncommon, then apply the same sort of bandages, after the same manner, to all the legs. The

tight bandaging, by its uniform and timely pressure, assists the relaxed vessels to contract and resume their natural calibre, and thus absorption is also promoted.

Three days after the operation of the physic ball is fairly over, the following powder may be given with advantage :—

R <sup>x</sup> Tart. anti., . . . .	3	vj.
Flor. sulph., . . . .	3	j.ss.
Nitre, . . . .	3	ijj.
		Mix.

To be very intimately mixed, and divided into six equal powders—one of these to be given every night in soft meat. In rather severe cases, let a half-ounce dose of nitre be given every morning in soft meat, and the nitre continued nightly for one week after the above six doses of compound medicine are all served up.

Occasionally the limb affected with weed will remain tumified and stiff, although not so painful as at the commencement of the attack. It is the more likely to do this if there have been several previous attacks of weed in the same limb. Should it continue in this state for some two or three weeks, then I put a rowell inside the thigh, about three inches below the stifle-joint, and four inches beyond the part you can see when standing opposite the animal's side. The rowell itself should be about two inches broad, and smeared daily with the following digestive ointment :—

R <sup>x</sup> Yellow Resin, . . . .	3	ij.
Venice turp., . . . .	3	j.ss.
Lard, . . . .	3	j.ss.
		Mix.

The rowell should also be turned round so far daily, and the place well cleansed : carry on thus for three weeks. If weed occur in a fore-limb, then I insert the rowel between the fore-legs. I have now and again used a seton in place of the rowel : it can be kept much longer in operation than the rowel.

If the treatment now pointed out be properly carried out, I have rarely seen it fail in restoring the animal to its wonted health, vigour, and suppleness of limb. At times, however, cases will occur that do not terminate so satisfactorily. I have mentioned that opposite to joints there are the lymphatic glands, often numerous glands ; I have also said that the inflammation and consequent obstruction of these glands in some locality or another are the principal features in this disease. In some few cases the glands in the neighbourhood of joints become enormously enlarged ; are on slight pressure exceedingly tender ; the constitutional fever remains, although in a modified form ; ultimately these glands ulcerate, burst, discharging a large quantity of semi-purulent stuff, each ulcer being a most ugly wound, with rugged, loose, and flabby edges. About the worst case of weed that I have seen ultimately do well was a young and strong grey mare. This mare had repeated attacks of weed, so far as I recollect, always occurring in the left hind leg. From these repeated attacks, with the ordinary treatment, she always got better, but the affected limb became gradually thicker after each attack. In the autumn of 1848 this mare had a most severe attack of weed. The whole leg became immensely enlarged from the udder to the hoof. She could scarcely move it, could not lie down, and, of course, was a case for the sling. About the common treatment was adopted ; and, at the customary period from the latest attack, I put a rowel in the usual place : no improvement. After a few weeks the tumified limb pointed at five different places, one on each side of the leg at the fetlock-joint, one on each side of the leg at the hock-joint, and one at the inguinal glands opposite the udder. I dressed these sores with diluted chloride of lime. During the first ten days they were open. Twice a-day I had injected into them a liniment composed of olive-oil and spirits of turpentine, equal parts ; ultimately following up this treatment with the *white lotion* :—



R	Acetate of lead,	.	.	$\frac{3}{4}$ j.
	Sulphate of zinc,	.	.	$\frac{3}{4}$ vj.
	Cold water,	.	.	One pint.
				Mix.

At my earnest request the owner did not destroy this mare, although at one time she was a hopeless-looking patient. After a while the sores all healed finely, and the owner sold her. Knowing the gentleman who purchased her, I last week took the liberty of writing him concerning her, and subjoin his answer:—

“C——E, September 18, 1862.

“DEAR SIR,—I have your letter in regard to a grey mare I bought from Mr B——e of B——d. I never saw any appearance of *grease*\* about her while in my possession, and I am of opinion that she was cleared of grease. I never saw anything the matter with her health. I bought the mare coming five years old. She was a completely worn-out beast when I bought her. She is twenty years old now,” &c. &c.

I have recorded another curious case of a mare which also had an attack of weed in a hind-leg. This limb continued extremely tumified, especially about the hock-joint, and after a while it pointed and burst on each side of the joint near the *os calcis*. The mare was very much exhausted, and I advised the owner to have her slung. He neglected to do this. She lay down, and, in her struggles about getting up, tore the skin over the *os calcis* across, between the two sores. I never saw an uglier leg; yet this mare did well, although she was a long time badly. The treatment in this case was the same as that recorded.

For these ulcerous unhealthy sores I have found nothing equal to Beaufoy's chloride of lime or soda, diluted with four parts of water. The application of this diluted wash twice a-day, with perfect cleanness, often works almost wonders in the way of bringing about a healthy action.

As regards cases where an attack of weed affects more than one of a horse's legs, although rare, yet I have met cases where all the four legs were so affected. Still, the local affection being diffuse, constitutional treatment is always equal to meet such cases, and in these I have never found local treatment necessary.

## CONTAGIOUS DISEASES IN CATTLE.

(From the Scottish Farmer, July 1.)

As bearing upon the bill now before Parliament for the prevention of the spread of contagious diseases among cattle, and as showing how an effective system of Government inspection tends to secure the interest of the farmer, we quote the following paragraph from a report upon Poland from her Majesty's Consul, Lieutenant-Colonel Simmons. The report is one of numerous others recently presented to Parliament in blue-book form. Lieutenant-Colonel Simmons says:—

“It may be interesting to observe that the total insurance paid by the proprietors against the murrain (*pestis bovum*) is about L.50,000 per annum upon 2,016,925 head of horned cattle; and the amounts paid therefrom as indemnity for animals destroyed was, in 1856, L.86,000; in 1857, L.14,000; and in 1858, L.7500. By the edicts issued with a view to prevent the extension of this disease, every proprietor of cattle is compelled to insure his stock, and becomes entitled to an indemnity for all diseased cattle, which by this law he is compelled to destroy immediately upon the appearance of the first symptoms of disease. These figures show the success which has attended the efforts of Government in the almost total suppression of the disease. In the year 1859 the destruction of cattle has even been less than in 1858.”

\* Grease—the vulgar term for weed.

In reference to the same subject, we may notice that the *Montrose Standard*, which takes considerable interest in agricultural matters, had last week a leading article in which, after exposing the absurd outcry which has been raised against the bill in some quarters, it remarks:—"But believing that most beneficial results will follow the *bonâ fide* and wise working out of the provisions of this Act—and we have no cause to fear otherwise—we cannot sympathise with those who would indulge in speculative doubts, and throw impediments in the way of others' exertions in their endeavours to remedy an acknowledged evil, by the method which has been followed with considerable success under similar circumstances in other countries, and which seems to be the only one at present most likely to meet the emergency."

## VETERINARY QUALIFICATIONS.

(From the *Scottish Farmer*, July 1.)

VERY plain subjects are often mystified in discussion by long and hard names given to things which admit of clear definition. No doubt some members of the Highland and Agricultural Society will think that the Royal Agricultural Society should have treated with greater deference the veterinary practitioners who hold the certificate granted after examination by the Highland Society to the students of the Edinburgh Veterinary College. But the Royal Agricultural Society has simply said that it will not recognise, as duly qualified veterinary surgeons, any but those that are legally entitled to this distinction; and it cannot recognise as a veterinary surgeon the person who, by the laws of the land, has not taken the proper steps to become a member of the veterinary profession. Many of Mr Dick's students do qualify themselves legally, and are duly recognised by the English Society; but some others listen to the doctrine laid down to them that the Highland Society's certificate is as good as any diploma in the land—and must suffer for their credulity. A few weeks ago, no less than twenty-one young men from the New Veterinary College, and thirteen from the old, were examined in Edinburgh, and received the legal diploma of the Royal College of Veterinary Surgeons. Now, we repeat, that this Royal College of Veterinary Surgeons has no more to do with the London Veterinary College than it has with Professor Dick's or Professor Gamgee's. It is quite an independent College, granting degrees, and constituted by the incorporated profession throughout the length and breadth of the land. The Highland Society and Professor Dick may not wish to recognise the veterinary profession as legally constituted, but the best students of the Clyde Street College, who are sufficiently independent to think for themselves, and sufficiently persevering to qualify themselves properly, present themselves before Professor Miller and his colleagues, and receive the diploma which can alone entitle them to the name of Veterinary Surgeons.

The veterinary profession has done all in its power to conciliate Professor Dick, elected him as Vice-President last year, and he was proposed as President this. Every deference has been paid to him, and still he encourages the splitting up of a small and useful profession into two factions. When Mr M'Lagan said that 740 young men had taken the Highland Society's certificate, he probably did not know that there are not above 250 of them practising, and the whole number in the army does not amount to a score. The number of young men legally qualifying themselves is annually increasing; whereas the number of those alone satisfied with the Highland Society's certificate is annually diminishing.

We are bound by all that is just and honourable to uphold the law of the land; and so long as the veterinary profession, lawfully constituted, appoints proper examiners and grants degrees, all members of that profession should be protected from infringement of privileges granted them by the Crown. The Highland and Agricultural Society has as much right to make doctors of divinity and doctors of law as it has to make veterinary surgeons; and the sooner it acts up to the spirit, not to say the letter, of the law on these points, the better for



itself. When it was determined to grant an agricultural diploma, adequate powers were applied for and obtained from Government. Why are veterinary certificates given without any such authority, and in opposition to a properly constituted body of professional men?

## ON THE ACTION OF TARTARISED ANTIMONY ON THE HEART.

By Professor ACKERMANN of Rostock. (Virchow's Archiv, xxv., 1862.)

By means of tartarised antimony we are enabled to induce different degrees of collapse by varying doses of the drug. Slight appearances of collapse accompany the first excitement of nausea, and they increase as the nausea increases. The frequency of the pulse also increases until immediately before vomiting, while its force progressively diminishes. The temperature of the peripheral parts falls in proportion as the nausea and frequency of the pulse increase. After the act of vomiting, or, when this does not ensue, after the termination of the feeling of nausea, appearances of reaction begin. Injections of tartarised antimony into the blood-vessels in dogs produce results similar to those observed in man. Professor Ackermann always observed, after injection of tartarised antimony, a diminution of the force of the blood in the aorta, and this took place whether the frequency of the pulse increased or diminished, but was greater with a slow pulse, and was greatest immediately before death. The operation of tartarised antimony may be explained by reference to the experiments performed. As this drug diminishes the arterial tension and the force of the heart's movements, it retards the circulation of the blood, and hence induces a decrease of animal heat, which becomes lower in proportion to its longer and more powerful operation. This lowering of the temperature appears to be occasionally interrupted by its elevation, and the latter seems to be dependent on the contemporaneous acceleration of the breath-movements. Professor Ackermann does not deny that the vomiting and purging may also hasten the cooling of the body, but he considers that these circumstances are not necessary conditions.

The irritability of the heart is perceptibly weakened by the use of tartarised antimony. In dogs killed by the injection of this salt into an artery, the irritability of the heart examined immediately after death was remarkably diminished, and sometimes altogether extinguished. The hearts of frogs placed in a solution of tartarised antimony lost their irritability much sooner than in pure water. The diminution of muscular power was also very remarkable. The breath-movements were sometimes calm, sometimes hurried, but for the most part very slow, with hasty, forced inspiration, and very long expiration, appearances which Professor Ackermann attributes partly to the congestion of the venous system and the deficient combustion, and partly to a directly debilitating effect of the tartarised antimony on the organs of expiration. The short and spasmodic inspirations which for the most part precede the long expirations, appear to be determined by a similar spasmodic contraction of the diaphragm as is seen before the act of vomiting.

The post-mortem examination of animals poisoned by tartarised antimony showed a general congestion of the whole venous system, the *venæ cavæ* and the portal vein being especially filled with dark blood; the liver, spleen, and kidneys excessively congested with blood, sometimes with extravasation; the lungs not, as Majendie maintains, changed in structure and partly hepatized, but for the most part normal, or at most showing some emphysema of the margins and small ecchymoses. The large intestine was regularly contracted both in length and breadth, and there were some ecchymoses on the folds of the mucous membrane.

## ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

At the monthly Council held on Wednesday 1st July, Mr Thompson, M.P., chairman, reported that the prize of L.25 for the best essay in Class II., on "The Breeding of Hunters and Roadsters," had been awarded to Joseph Gamgee, Esq., senior, New Veterinary College, Edinburgh. In Class IV., the prize of L.25 for the best essay on "Reclaiming Waste Lands," had been awarded to Mr Charles Belcher, Little Coxwell, Faringdon, tenant of Potter's Hill Farm, Wichwood, Oxon. In Class V., "On Movable Fences for Sheep," none of the competing essays were considered worthy of the prize.

Members of Council were requested to forward to the secretary suggestions for prize essays in 1864.

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THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND'S  
MEETING AT WORCESTER.

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## HORSES.

(From the *Mark Lane Express*, July 27.)

THE horse ring at Worcester was decidedly the centre of attraction, in spite of the straightest backed bulls, clothed cows, improved pigs, or sheep with the whitest of wool, clipped in the "last new style" by the most fashionable and scientific of shearers; of steam ploughs, traction engines, thrashing or washing machines, and the most complicated of rat traps. After all that has been said and sung about the deterioration of the breed of horses, one thing at least was very apparent from the expressions that continually broke forth from not only the men, but the lasses in the crowd after crowd that encircled the ring—viz., that if the horse be deteriorated in breed, the Englishman's love for him is in no way diminished, and that we are as proud of him as ever. The roped ring and comfortable boxes, although on a smaller scale, continually remind one of Battersea, Mr Tom Pain still being "The Genius," and keeping admirable order in the quietest and pleasantest manner. For the Royal hundred a dozen stud horses entered the arena, all considered by their owners as best calculated to improve and perpetuate the sound and the stout thorough-bred, and which was duly confirmed by the judges highly commending the lot:—Rouble, by Cossack, a neat, level, hunting-looking bay, with smallish thighs and hocks; Ancient Briton, a chestnut, very wiry, muscular and lengthy, with shoulder well laid back, rare quarters, short back, long thighs, and hocks near the ground; still he was rather leggy, and had not the most agreeable countenance, but is nevertheless a very useful horse; Plum-Pudding, a dappled bay, well christened, being a heap of flesh and as round as a dumpling; Malek, a weak-necked, stilty, and flat-sided animal; Cavendish, a rich dark brown, with fine frame, and very muscular—short legged, and all over a really stout, hardy-looking animal, with fair action, if perhaps a little short in the thighs; Neville, a vulgar-looking horse, with a coarse heavy neck, and low harness withers, bad forelegs, weak arms, elbows in, and pasterns that all but let the fetlock joints on the ground as he threw his legs about, as if he wished to get rid of them—a style of going that ought to have shafted him long ere this into some Lord Tom Noddy's cabriolet. There is nothing like good action; but we do not think that false, flashing, flourishing action ought to be encouraged in the show-yard, because, through some ever-varying whim of fashion it now happens to command a price. And we would seriously remind our judges that there are far more grave things to be thought of than the mere capricious tastes of Piccadilly dandies, when awarding a prize to a thoroughbred horse for general stud purposes. Let our authorities endeavour to set the fashion, not to follow, by going



in for the useful as well as ornamental—for a horse that bends the knee, strikes out from the shoulder, with elbow free, setting his foot down firm, and at the same time getting over the ground ; and not by upholding your flashy Nevilles, throwing their legs about like ballet-dancers, or the pony Tom Sayers, hammering away in the same place like a blacksmith at an anvil. Conscript was common, light, and sickle-hocked. Cambondo, the lady-killer, never looked better, being made up to a nicety ; but nothing can hide his deficiency in the back ribs. He is short and leggy, but good-limbed. Lord Albemarle, a switch-tailed bay, and Cawood, a dark brown, were not the sort of horses required ; nor was Stampedo, though low, lengthy, and powerful, as his hocks ought for ever to disqualify him for such a prize ; while the last, Merryman, was a short cobby horse, with a badly set on neck, and a head somewhat resembling Mango's, the sire of his dam. However, Neville took the first prize, Cavendish the second, Cambondo the silver medal, and Rouble had the honour of being kept in the ring longer than any of the others. The next class, worded as "Stallions suitable for getting Hunters," made any thoughtful man immediately inquire what ever the previous class was intended for ? and we are very glad to hear that the judges have recommended the abolition of the other henceforth, as we recommended that it should have been long since. A greater medley never appeared in a ring, consisting of gig horses, carriage-horses, trotting cobs, clothes-horses, if we may judge them by their wooden looks, and one great lumbering brown, suitable for a carrier's cart. Amongst the better was Sir Peter Laurie, just nineteen years old, and just the very sort of horse we want to get rid of—the modern steeple-chaser, a nag with a neck like a giraffe, as leggy as a foal fresh dropped, with a very light middle-piece, and that gone in the back ; yet this was the horse that took the first prize, and that thousands were to carry away in their mind's eye as a model to get hunters ! Whitmore, and the Prince of Wales, were ordered out of the ring almost before they had completed the circle ; whilst Bromley, who had a damaged leg, through getting across an awkwardly-placed bar in his box, had the honour of being kept in to the last, making his owner fancy, for a time, the prize was actually going into the land of Bucks ! The premium for brood mares for breeding hunters was awarded to Lalarge, a thorough-bred one, with a capital shoulder—a great point in any riding horse, especially a hunter, but a recommendation which, in this class and the others, was rather scarce. The second prize went to Whisky, a long wiry-looking brown ; the third to Salt Fish, a good stamp, and roomy. The hackney brood mares were not well represented, the first prize going to Crafty, a stout common little mare, of about fifteen hands ; and the second to Polly, who was too much of a pony, though Cygnet was clever looking. The prize for stallion ponies was won by Tom Sayers—a heavy necked cobby animal, with hammering action, which his groom could afford to imitate, bringing his knees nearly up to his ribs, and causing great merriment to the bystanders, but at the same time showing that Tom was not getting over much ground. Dick, a brown, a hand higher, and a long stylish animal, with great liberty of action, had far more appearance. Pretty Lass, the prize pony, a thick mare, has, as we reported at Ipswich, no action to back her looks ; and Enid, from Norfolk, is one of a match pair. Then came the "mares or geldings exceeding four years old, equal to fifteen stone with hounds," which was decidedly the best represented class of the meeting by a very long way, and containing many really fine framed horses. There were in all six-and-twenty, and, as they came one after the other into the ring, Worcestershire gave vent to a prolonged note of admiration, "What a fine lot of horses !" But fifteen stone with hounds is a great weight ; two stone less would have been more agreeable to many of them. The first prize horse, Mr Booth's "Beechwood," is up to the weight, with a good shoulder, but greatly disfigured by being fed like a bullock, and having rubbed the hair from his dock. The second best was a nice-looking bay mare, Elastic, with not the best of shoulders, nor the shortest of cannon bones. Endurance, one of the specially commended, was of a rare stamp, barring a loaded shoulder ; Brilliant, a good goer, but light in bone ; Blitterlees, a thick little bay ; the Confederate, a nice horse but small ; Mr



Wheeler's a good sort, and Middleton a short useful horse for the country. Merlin was not amiss, and Bessie Swinton showed some blood, whilst Perfection in form was perfect as a hunter, but of a smaller stamp than Beechwood; Topsy, a stout, hardy-looking mare wanting a dash of blood, and the Pelican looking more like winning a hurdle race in the wilderness. Steam Plough, an extraordinary animal for power and action, well up to twenty stone in a confined country, brought forth further exclamations of "Look there! what a horse!" and the only fault we had to find with him was that he reminded one a little too much of the plough. Mr Gilford's bay at once put you in mind of the country from whence he came—Leicestershire; Little Bobby is a neat thick little nag, while Mr Philip Smith showed a very nice chestnut mare, and Mr John Watson an old-fashioned one; both up to weight, and both out of Worcestershire. The next class offered prizes "for three-year-olds likely to make a hunter *or* carriage-horse;" but probably the gentlemen who drew up this heading meant a hunter *and* a carriage-horse—with, in fact, an eye for something quiet to ride and drive. Harold, from Shipston-on-Stour, is a horse with not the best of heads, but in every other respect likely to grow into a first-rate hunter; and Brunette, a mare of good form, strong limbs, and showing some blood. Of the others, Mr Morris' The Premier, two of Mr John Philip Smith's, and one of Mr Henry Lakin's, were the only other entries promising to make hunters. Of the two-year-olds "likely to make a hunter or carriage-horse," Grafton is a nice-shaped game-looking animal of a bad colour—a dirty spotted dandy grey russet; while Parvenu, his second, is another likely-looking one. The choice of the others were Event and Rowley. Of Mr Branwhite's two cobs under fifteen hands, the chestnut is a very nice nag, and with the right sort of action, but the other is too common and carty in his appearance, and short in his going. Fairy Queen was a nice light hack, with a capital shoulder, but doubtful hocks, very neatly fired; and Mr Moffat's four-year old looked like growing into something sweet, as did Mr Hankey's Peter Simple. So far the show of horses was encouraging, and in some classes, such as the weight-carrying hunters, remarkably good. With, again, Cavendish first, and Neville anywhere else they chose to put him, the third offer of the thoroughbred hundred would have quite reached its aim; and many of the young riding-horses were commendable. In fact, this section of the show is manifestly improving; whereas, if we are to take Worcester as the test, the agricultural horses are as palpably retrograding, for it is many years since so small or so poor a lot of draught-horses have been brought together under the auspices of the Royal Society.

## GREYHOUNDS POISONED BY CASTOR-OIL CAKE.

(From *The Field*, July 11, 1863.)

I HAVE taken the liberty of sending up for Mr Buckland the particulars of an extraordinary case which happened to three very valuable greyhounds, as well as samples of the food which we believe caused their death, and I should esteem it a great favour if he would give us his opinion on the subject of their death, as to whether it was caused by any poisonous seeds in the cakes, whether it was the direct action of the castor-oil cake, or whether the shells in the cake had perforated the bowels, and caused the poor hounds to bleed to death? Circumstances under which the cake was taken, and the symptoms of poison:—A few bags of these cakes, with some other sorts, were sent from Calcutta as probably useful for feeding purposes on a farm. The brown sample was described as rape-cake, the white one as castor-oil seed cake. A portion of each of these cakes, principally the white, were taken by mistake by the person who prepared the pig food, and made up with the usual house refuse. About four or five greyhounds were loose in the same yard as the styes, and had jumped over the low wall and eaten heartily of the mixture, the older dogs having, as usual, got the largest share. The pigs, whether they had refused it or not, suffered only slight diarrhoea. The dogs



were all severely purged, which resulted in two of them voiding at intervals quantities of pure blood. Arrowroot and laudanum-and-brandy in small quantities were administered at intervals, with some broth afterwards; but two died within thirty hours after taking the cake, and one or two continue very ill. The cake was swallowed on Saturday morning, and it was not until Sunday morning the purging was observed, it having occurred during the night. Extraordinary quantities of blood were voided; no vomiting took place, nor could any spasms or acute agony be observed. Does the cake contain an irritant poison; or is it probable the shell can have perforated the intestines? Or can it have been non-injurious, and some other substance have done the mischief?—T. M. C. (Liverpool, June 22.)—[I have no hesitation in stating that it is my belief that the greyhounds were poisoned by the castor-oil cake, which I have examined, and which I find to leave a highly acrid and almost stinging taste in the mouth. I imagine this cake to be composed of the seeds and husks of the plant, after the castor oil has been pressed out of it. Now these seeds themselves are exceedingly drastic, both to men and animals. I here give a case in point. Dr Royle, author of a valuable work on *Materia Medica*, tells us that he was once called up in a great hurry to the hospital boat, when proceeding with a battalion of artillery up the Ganges, with the statement that several men had been poisoned or seized by cholera. The seeds shown as having been eaten by the men were castor-oil seeds, and they had feasted on them under the name of "Indian filberts." Three of the men suffered severely, and were not discharged from hospital for some time. We have in the cases of the greyhounds a similar instance of poisoning. All the symptoms exhibited by these dogs may be referred to the action of the powdered substance and husks of the castor-oil seed. I have heard that pigs pick up and eat the seed of the castor oil in the countries where the plant grows, and do not suffer from them. I should like this story to be confirmed, as if true it will account for the pigs in the present case not showing the same acute symptoms as the dogs.—FRANK BUCKLAND.]

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### REMOVAL OF PEDUNCULATED TUMOURS BY ELASTIC LIGATURE.

M. ADOLPHE RICHARD, at the recommendation of M. Trousseau, has recently been experimenting on the removal of pedunculated tumours and analogous growths by the employment of an elastic ligature, formed of a caoutchouc thread. In the seventeen cases in which he has employed it, it has answered its purpose admirably, and he considers it as very preferable to the ordinary ligature. Its action is more continuous, and never ceases until the end to be attained is accomplished, while the pain after a few hours is insignificant, and the healing process afterwards is a very rapid one.

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### DEVELOPMENT OF THE LINGUATULA OF THE MESENTERIC GLANDS. By M. COLIN.

FROM THE REPORT OF THE IMPERIAL AND CENTRAL VETERINARY MEDICAL SOCIETY.

(From *Recueil de Médecine Vétérinaire*, April and May 1862.)

IN the present paper M. Colin continues the subject of a previous communication made to this Society (See *Edin. Vet. Review*, vol. iii. p. 682). It will be seen by referring to that paper that Colin had put the small *Pentastoma*, in which no sexual organs had been developed, into the nasal cavities of five dogs. Three of these he had killed at different times, the last fifty-seven days after the introduction of the parasite, and found the latter developed into *Pentastoma tenoides*, having acquired reproductive organs, and the female having been fecundated.

At the present time, eight months after the parasites were given, the large Newfoundland dog referred to has been killed. Eleven out of fifty parasites have been found, nine males and two females, lodged in different parts of the turbinated bones and ethmoid cells. The two females were each about four inches long, and lodged respectively in the depth of the right and left middle meati. They were rolled upon themselves after the manner of serpents, and one seemed to have fixed its hooklets into the pituitary membrane. The males, about four lines in length, were scattered through the nasal chambers, and moved actively from one point to another for a considerable time after the death of the dog.

The females, which were presented to the Society, had their copulative sacs crammed with spermatozoa, and the oviduct filled from end to end with eggs of a golden yellow colour, quite patent to the naked eye. Their zoological characters, and the various peculiarities of their structure, exactly correspond to those of the female *Tænia lanceolata*, found in the nose of the dog and wolf.

In the males, the intestine, prostates, vesiculæ seminales, and spermatic glands, are well shown through the skin.

M. Colin proposes further to give the ova of these parasites to lambs and other animals, in order to trace them to their original source.

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## HYDROPHOBIA.

(From Galignani's Messenger.)

M. BOULEY's paper on this subject contains, on the first symptoms of hydrophobia, certain practical data which should be most extensively circulated. One of the most important circumstances calculated to excite suspicion is seeing a dog rub his chops with his forepaws, as if he had some bone jammed between his teeth, or sticking in his throat. This is a very dangerous symptom, because the master, desirous of relieving his dog, will put his fingers into its mouth, and may thus receive a bite, which he may disregard until it be too late. A dog vomiting blood should also be attentively watched. Another striking symptom, which reveals latent hydrophobia beyond any possibility of a doubt, is the change of the tone and pitch of the animal's bark. Such a bark, once heard, is never forgotten, and can never be mistaken for any other. Instead of barking freely three or four times in succession, as it usually does, the animal utters one loud bark, and then three or four decreasing howls, during which the jaws are not closed together; moreover, the sounds emitted are hoarse, damped, and lower than usual. Under the influence of hydrophobia a dog will suffer pain in silence; it may be struck or pricked, wounded in any way, or even scorched, without uttering the slightest howl or whine; it feels the pain, since it tries to avoid it; but it certainly feels it less than in a state of health, because it will even bite itself unrelentingly. A dog of Count Demidoff's actually bit off its own tail in a fit of hydrophobia. If, then, a dog receives strokes with a horsewhip without whining, this circumstance should put the master on his guard. A mad dog will fly into a rage on perceiving an animal of its own species; this excitability in a quiet dog becomes a very serious symptom. Lastly, a dog labouring under the first symptoms of hydrophobia is apt to quit his master's house for a couple of days; and if not killed during that interval in some populous district where his condition has been discovered, he will return to his old dwelling in a far more dangerous state than when he left it, and rendered doubly so by the circumstance that the inmates will welcome the truant home with all sorts of caresses, which he is likely to repay with a deadly bite. A dog, therefore, that has been absent for a day or two, and returns in a dirty and haggard condition, must be very carefully watched before he is re-admitted to the same familiarity as before. These different symptoms are particularly valuable, because they will reveal the disease before it has reached a dangerous stage.



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### ORIGINAL COMMUNICATIONS AND CASES.

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*The Joint Disease amongst Lambs and Cattle: being an Address delivered at a Meeting of the Kelso Farmers' Club on Friday the 3d July.* By WM. ROBERTSON, Esq., Veterinary Surgeon, Member of the Scottish Board of Examiners of the Royal College of Veterinary Surgeons, Kelso.

MR CHAIRMAN AND GENTLEMEN,—I need not here tell you that it is a fact established by the concurrent testimony of competent observers, that, in proportion as we remove animals from what may more properly be considered as their natural or more primitive condition, in like manner do we increase in a given ratio their susceptibility to contract disease; this very interference acting in numberless ways as both predisposing and exciting cause. This truth holds good, not only as regards man, the highest development of life, but in an equal degree of those beings lower in the scale of animated nature which he has made subservient to his necessities or luxury. Civilisation and the advancement of social science have not only acted and reacted both to the advantage and disadvantage of their promoter, man, but have further operated with much similarity in those animals which he has taken more immediately under his protection. To supply the demands of an increasing population, not in our country only, but through the world, every attention is being bestowed on the production of such animals as are best fitted to supply those wants; and as these are mainly valued as food-producing agents, as much, and it may be more, attention is being bestowed on the production of an ideal form in our cattle and sheep than is directed to their mere numerical increase, this peculiarity of form of necessity giving a peculiarity of constitution. In this endeavour to reach perfection with our stock, there is brought into operation much skill and perseverance. They are carefully tended in all pertaining to their reproduction, location, and feeding; they are the

produce of parents as highly bred and artificially dieted as themselves. Every circumstance which can add to their early development and flesh-producing powers is carefully noted and strictly applied. But although the object sought is so far attained—witness our improved breeds of cattle and sheep as compared with the more primitive—still it is at the expense of constitutions more favourable to disease, and less able to resist its inroads, and are only remunerative when all external circumstances of food and location are in keeping with constitutions so artificially developed.

It is to the neglecting of this—that there must be a just relationship between the animals we possess and the treatment they are subjected to, a proper adaptation of extrinsic circumstances to the constitutional peculiarities we are dealing with—that such unsatisfactory results occasionally occur from the breeding and feeding of stock ; while there is nothing more certain than this, that where these are properly understood and judiciously applied, the results obtained are most satisfactory, disease and death seldom reach above the minimum.

The practical value and truth of these remarks I have no doubt will be abundantly evident in more particularly considering the subject of to-day's conversation—"Arthritic or Joint Disease in Cattle and Lambs."

Before, however, discussing those morbid appearances characteristic of this affection, it will be better—because helping us to understand these—to examine shortly the structure and functions of those parts in health.

The large joints of the extremities to which the ravages of this disease are chiefly confined belong to the class known as the diarthrodial, or most complicated of the articulations ; they are neither homogeneous in their component parts nor simple in their functions. Essential to their formation are bone, cartilage, ligament, and synovial membrane. Other structures—as fibro-cartilage and fat—are occasionally superadded. Each of these structures being somewhat different from another, must of necessity evince under disease individual peculiarities. The bones serve as the framework or basis of the animal machine, and on them all the other structures are built ; towards their extremities, where they enter into the formation of joints, the inner structure of cancelli becomes expanded, the outer shell of compact tissue thinner and harder, while the true articulating surface is tipped or covered with a glistening, pearly-looking, insensible material, known as articular cartilage—a structure of vast importance in the economy of all joints.

The connection subsisting between this and the underlying bone is extremely intimate ; the extremity of the bone is rough and uneven, while this cartilage, being composed of a fine network of fibrous tissue, amongst which are cells and a quantity of granular matter, is laid down so as accurately to fill up the vacuities in the roughened extremity, ever thickest in the centre of the articulation,



or where friction is greatest: it is from this supporting bone also that its nourishment is in part derived. The ligaments are bands of inelastic white fibrous tissue, stretching from the end of one bone to that of another, entering into the formation of a joint, serving to retain these in their proper position; or, as in all the true joints of the extremities, in addition to these bands, this same tissue takes the form of an uninterrupted sheet, passing from the extremity of one bone to that of its fellow, thus rendering every true joint a perfectly close cavity; this bag is always loose to admit of motion between or amongst the bones of the articulation.

The other essential structure of these joints—synovial membrane, a form of serous membrane—is found lining the interior of the last named, the capsular ligament, and is also reflected over the articular cartilage in the foetal animal, but as adult life is approached, becomes absorbed from the centre of this cartilage; it is, however, found during life in all the true joints at the edge of the articular cartilage, thrown into folds of greater or less extent, named fringes, having on their free margins slight swellings, the convolutions and loops of its nutrient vessels, which have sometimes received the names of synovial glands. The office of this membrane, and more especially of these fringes and ganglions, is the secretion of a peculiar fluid known as synovia, a compound of water, albumen, and animal salts, to serve in the lubrication of the joints. And assuredly it is the most perfect joint-oil in nature: it is secreted, as required most, during exertion; least when at perfect rest; while, when in a state of health, it never thickens or becomes rancid.

To the proper performance of the acts of locomotion, and the integrity of the whole system, it is necessary that the individual functions performed by each and all of these tissues be performed in a healthy and normal manner. None of them can become diseased without the others to some extent, and in a certain time becoming involved with them. Still, from the fact that each has an individuality of structure and function, they are also liable to exhibit under disease individuality and distinctiveness of symptoms.

I believe, gentlemen, I may assert without fear of your contradicting me, that this arthritic or joint disease is on the increase, more especially amongst lambs; not that there is a regular yearly addition to our mortality or loss from this affection, but what I mean is, that it is much more prevalent now than some years since. For very marked visits we must look to concomitant or concurring circumstances, which will generally be found associated with some peculiarity of season, location, or dieting, of which more afterwards.

In all its varieties of form and development, this arthritic or joint disease, may be viewed as springing from two main sources—causes constitutional; causes local. The first of these, and by far the most important, the constitutional and predisposition, shows itself in one of two forms, the scrofulous or rheumatic; and again, either of these cachexies may be much modified by causes which

may be considered as immediately exciting—that is, animals which have undoubtedly inherited either a scrofulous or rheumatic diathesis may, under favourable conditions, escape being affected; while others, less fortunately circumstanced, may fall victims, or, as in certain cases, both these tendencies are associated in the same animal.

The causes which operate locally are generally not difficult to discern, and principally terminate in acute synovitis.

From what has already been stated, it will be noticed that of those tissues or structures entering into the composition of joints, bone and synovial membrane, from their vascularity and sensitiveness, are of all others most liable to become affected with any form of inflammatory action, and to exhibit the most distinctive and well marked symptoms under any disordered condition of the articulation.

Of those animals in which we are most in the habit of observing this arthritic disease—cattle and lambs—the latter appear more extensively affected. The form of disease in those two classes of animals is somewhat different—in cattle the rheumatic is in ascendency, while in sheep it is the scrofulous. The symptoms connected with the development of this disease in both cattle and sheep are too well known and easily recognised to necessitate my dwelling at any length on their description. In calves, as I have already stated, it is more frequently the rheumatic form of inflammation which is observed affecting their joints, not that other complications never occur. In this case the disease does not, as a general rule, seize on the animal before it is some weeks old, and not unfrequently can we lay hold of some exciting cause which, operating on parts constitutionally predisposed to this cachexy, has tended to its development. Lameness, the most attractive symptom, is as severe as it is sudden; the animal the last time seen may have had perfect freedom of locomotion, and apparently been in the enjoyment of the most vigorous state of health; it may now be totally incapable of progression, or only able to accomplish this with the greatest difficulty, while the amount of pain is evinced by the marked constitutional symptoms; fever is very high, showing itself by increased surface temperature, injection of visible mucous membranes, pulse increased in number and volume, respirations disturbed, appetite capricious or entirely gone, &c.

Manipulation of the affected limb will at once satisfy us of the nature of the affection; one or more of the joints will be swollen, tense, and very painful. The swelling will be found to show itself at those parts of the articulation which are least bound by ligament or tendon, and this, in addition to the peculiar fluctuation, is at once indicative of capsular distention from an increased secretion of synovia. All these symptoms may be most marked, and for several hours the condition of the limb remain much as indicated, when, in a most unaccountable manner, all these local symptoms become



ameliorated or entirely disappear, only to be reproduced in one or more of the as yet unaffected extremities—this flitting, with relief and exacerbation of symptoms, being markedly characteristic of the disease in young cattle in its earlier and more acute form.

At this stage there is merely increased vascular action, with an evident increased secretion of the natural fluid, which is doubtless somewhat altered in its chemical constituents or component parts. Very shortly, should the symptoms not cease of themselves, or become arrested by treatment, we have change of structure: this synovial membrane becomes somewhat thickened, softer, and not so clear looking; at the same time portions or flakes of plastic material or organisable lymph show themselves in the more fluid contents of the capsule, to the walls of which, as also the loose synovial membrane, they become attached, forming bands or layers of false membranes, by which I have found, in many cases, obliteration of portions of the articular cavity, the walls being approximated and held together by the intervening structure. Seldom, however, does the process stop here: the fibrinous exudations do not seem very capable of taking on healthy organisation, so as to finish the adhesive process; more generally does the inflammation proceed on to the further and more destructive terminations of pustular secretion and ulceration. There is, coincident with the advancement of the process, an augmentation in the intensity of the symptoms exhibited, both local and constitutional; the swelling is larger and more tense, the fever higher, pain, heat, and general disturbance increased, while fluctuation conveys to the touch the tolerable certainty that pus, not serum or synovia, is now contained within.

If not evacuated, it will give indications of pointing, and by absorption and ulceration of the confining tissues, give exit to itself. Following this evacuation of matter, there will generally be a relief from pain, not however of long continuance, as the inflammatory process will shortly renew its supremacy, and proceed with fresh vigour until the articulation is completely altered in structure, and rendered totally unfit for the performance of its ordinary functions.

All this will occur if the animal has sufficient strength, and does not succumb to the effects of so much disturbance on the system.

Of that arthritic disease, originating in a scrofulous cachexy, when occurring in cattle, I have found that it exhibits a partiality for the stifle joint; which much cannot be said of its development in lambs, where, as already noticed, it is more common. It is in many features, even to a casual observer, different from the rheumatic form. When affecting cattle, not so apt to involve all the joints as to persistently attack one; in lambs, however, such does not hold good; while in this stock, in all those severe visitations of the disease which have been so fruitful of death and destruction, I have found much of both forms, not only in the same flock, but also in the same individual animal, the scrofulous diathesis most clearly prevailing. The most marked symptoms are here not the results of

the inflammatory process in the synovial membrane and soft parts, as in the former, but are seen to be connected with or originating in the epiphyses of the bones themselves. They are evidently enlarged. This, it has been asserted, is more apparent than real, seeing the muscles and tendons become spasmodically contracted, and of a shrunken appearance ; still the enlargement in many cases, and to a great extent, is real. The bone is inflamed ; the cancellated texture expands to accommodate itself to this inflammatory process, while in many there is distinct deposition of tubercular matter amongst the cells of the cancelli. The joint itself, as distinct from the articular extremities of the component bones, is much increased in size, the skin is tense and tender, this resulting from exudation and partial organisation of effused material amongst the surrounding soft tissues. This uniform solid feeling is quite distinct from the bulging, although tense swelling, characteristic of disease originating with the soft tissues.

The deposition of tubercular matter, or carious inflammation of the articular extremities of the bones, may remain for some time ere undergoing any change, or may rapidly terminate in pustular degeneration of the bone, the secretion gradually finding its way by absorption and ulceration of intervening bone and cartilage into the cavity of the joint, there by its peculiar solvent powers acting still further as a disintegrating agent.

The symptoms accompanying this form of the disease are sufficiently distinct to enable us to identify and distinguish it from every other. There are the common symptoms of fever, pain, &c., with more distinctive swelling of the bones themselves than bulging of the capsular ligament, added to which we have the other and constitutional indications of the cachexy. The animals are born with these diseased joints ; in many lambs this is very obvious ; in others, if not so well marked, it is generally observable shortly afterwards. In them, too, there will almost invariably be present extensive disease of the internal viscera. The whole system is deeply tainted with scrofula. I have no doubt you have noticed, or if you have not noticed for yourself, you must have heard your shepherd remark—"This or that lamb cannot live, it is pocking at the navel." The belly is pendulous from the presence of a turbid fluid in the peritoneal cavity ; in this fluid are floating shreds of unhealthy-looking fibrin. The umbilical cord is always much enlarged, so much so as to attract attention whenever the lamb is dropped ; it is soft, flabby, and the vessels filled with very dark-coloured blood. There does not seem the least inclination to that early change of these structures into the well-defined ligamentous cord extending to the liver, characteristic of the perfectly healthy animal ; instead of this there is developed a chain of cysts, containing pus mixed with tubercular matter, extending from the umbilicus to the liver—this latter organ exhibiting change of structure and the presence of pustular and tubercular matter—the omentum and mesenteric glands occasionally



showing like morbid conditions, from which, as a sequel, we have the presence in the abdomen of the already mentioned purulent serous fluid and externally evident pendulous abdomen. In all such cases, where the constitutional cachexy is so marked and destructive in its progress, we are only able, by the most careful treatment and nursing, to save a small minority ; and I am of opinion it is better not even to attempt this, as any that may recover are never remunerative as breeding and very rarely as feeding animals.

In connection with this arthritic or joint disease in lambs, although I do not think inseparably associated with it, there has for some years appeared a peculiar diseased condition of the circulatory system, accompanied with abscesses of the soft tissues in various parts of the body. It is evidently new, or at least much more prevalent than at any former period. My own opinion is, that it has occurred occasionally for a lengthened period, but never to such an extent as to attract attention until a few years since ; and in its development there has always existed much that is difficult fully to comprehend. It seems essentially a disease of the blood, and having its origin during intra-uterine life, evidencing itself by numerous and distinct patches of congestion and blood effusion, not confined to where most expected—where cellular tissue is most abundant—but the opposite. It is rapid in its external development of symptoms, and extremely fatal in its results. Although associated with joint ill, it does not seem absolutely necessary to its development that these structures should be diseased, nor does their freedom ensure exemption from this more fatal malady. It seems most probably to be associated remotely with a peculiar condition in the ewe during a particular period of gestation, the presence of an extra amount of rich blood-forming materials ; and immediately with the lamb itself, in the fact that it is young, the tissues as well as the blood-vessels are weak and tender, not at all capable of resisting this hyperæmic condition and altered chemical constitution of that which is the life, the blood. The differences between this disease of itself, and the arthritic or joint disease in all its forms, seems greater and more marked than all their similarities, giving the preponderance of weight to our considering it as a totally distinct disease ; and I would not have noticed it here had it not been from my knowledge that all of you have heard of its existence in connection with joint disease, and many have felt its disagreeable and damaging results.

In considering the causes operating in the production of joint disease, we may view them under two classes—1st, Predisposing or remote ; 2d, Immediate or exciting. Of these the former are by far the more important, and are entirely constitutional and hereditary.

In the entire circle of animated nature, human as well as brute, the law that like produces like, operates with undeviating certainty. Not only does the parent transmit to the offspring its own or similar generic features, but the distinct marks of species and varieties, as

well as the peculiarities of individual animals, are all transmissible by hereditary influence. Not only is this influence physical, and confined to the external form, but is alike powerful over internal organs, their texture and constitution extending to those qualities, habits, and dispositions which it is extremely difficult, if not impossible, to associate with any organic structure; and all these alike observable in animals, whether possessed of frames symmetrical and beautiful, or ill-proportioned and deformed; of constitutions healthy and vigorous, or diseased and weakened; of dispositions tractable and docile, or fiery and unmanageable. It is an assumption of, or belief in these principles, which has led man to make any improvement or variation in the breeds of our domestic animals; they are, in truth, the very foundation of the physiology of reproduction, whether amongst animals or plants.

Now, gentlemen, you well know that nothing is easier to trace than an introduction of fresh blood amongst your already highly-bred sheep stock. You can be benefited or damaged by the stranger according as your selection is judicious or otherwise—not for one or two years, but for an almost indefinite period. His distinctive features may disappear in one generation only to appear with greater distinctness in another. And if you thus find the length of a face, the curve of a nose, the position of the ears, or the quantity and quality of wool on any particular portion of the body so capable of being produced at will, and when so produced, so persistent in future generations, you need scarcely wonder that diseased and vitiated constitutions should reproduce themselves in their offspring. It is not at all necessary that to be hereditary or constitutional any disease should be transmitted already developed from sire to son: all that is required is that there be given to the animal from its parents a certain peculiarity of constitution, physical or mental, which, with or without exciting causes, will furnish material and opportunity for the development of a particular disease. However, there are some diseases, as this scrofula we have noticed as evidencing itself in much of the joint ill in lambs, which, besides occurring in systems peculiarly predisposed to its development apart from any external causes, is not unfrequently congenital. I have examined lambs which had died immediately after birth, and have found tubercular matter on the omentum, and in the mesenteric glands. Now, although you may not notice such diseases as either rheumatism or scrofula—the two cachexies from which originate the greater number of cases of arthritic or joint disease in the produce of even animals which you are convinced are unsound—it is no proof that the progeny are perfectly healthy: the taint is not of an invariable uniformity of virulence, and, when slight and external circumstances are favourable, may escape the most acute observer, and never in the slightest interfere with the growth of the animal. While it must also be borne in mind, that it is no uncommon circumstance that such a constitutional taint may disappear in one



generation to appear with greater virulence in a succeeding, or it may be supplanted by an affection somewhat analogous, or merely by a variation of the leading or constitutional disease.

#### IMMEDIATE OR EXCITING CAUSES.

There is one feature characteristic of both those constitutional tendencies of which we have been remarking: it is the facility with which they are developed under the smallest exciting cause; both scrofula and rheumatism are most surely developed—where the hereditary taint exists—in connection with those causes which, as a general rule, are antagonistic to good health in all animals. Amongst young cattle there is probably no more fertile source of the malady than a defective sanitary condition of their houses. Dark, ill ventilated, undrained, filthy paddocks are not at all fitted for the rearing of healthy stock. Even when possessed of robust, healthy constitutions, this, in conjunction with improper alimentation—which I can testify they too often receive—is sufficient to develop the worst forms of rheumatic and scrofulous disease. And what can we expect should the little animals be affected constitutionally with either of the cachexies, in however mild a form? Not certainly that any should escape. The animals being young, all those functions subservient to the development of the system are in the most vigorous operation, this functional activity merely rendering them more susceptible of disease. The small amount of exercise they are enabled to obtain is injurious, from the compelled inactivity to which the joints are subjected. Again, it not unfrequently happens that they are turned in a great hurry, without preparation, from too warm paddocks and close confinement into the open air and perfect liberty; the transition is too great both as to temperature and exertion.

Amongst sheep stock, those causes which seem to operate as exciting agents may be referred generally to atmospheric influence, location, and nutrition. Atmospheric influence is a term of much ambiguity, and too often employed to veil our ignorance; the laws by which this is regulated are still much obscured or little understood; so when brought to a stand still in our investigation of results, too often do we fall back on this very convenient term. We know these must have some definite cause or causes from which to originate, and not being able to lay our finger on the better understood, are apt to assign them to those causes whose nature and operations are more doubtful and difficult to elucidate. Still there are certain conditions of the atmosphere, as its temperature, its moisture or dryness, &c., the actions of which we can with tolerable certainty predict. Even when very young lambs can with impunity endure a comparatively low temperature, if unaccompanied with moisture; when, however, a damp lair is added to a dry frost wind, a very active exciting cause of rheumatic inflammation of the joints exists.

The little animals are inclined to lie, the circulation becomes flagging, and, if there exists the slightest constitutional tendency to this rheumatic diathesis, the system rapidly succumbs. A deficiency of shelter, and a naturally damp condition of soil, will further tend to ensure an earlier and more confirmed form of the malady. If, in addition to these causes, there is a defective or perverted nutrition, which may have originated with the lamb during intra-uterine life as well as subsequent to birth, then we have the most favourable condition for the appearance of the scrofulous cachexy.

In regard to the treatment of this serious malady, I fear that anything I may say, especially as to its cure, will be unsatisfactory; still, I have for some time been sanguine that much might be accomplished as preventive. In the earlier stages of those cases occurring in young cattle where the constitutional fever is high, the pulse accelerated and full, a certain amount of blood had better be abstracted, the bowels got under the action of a mild saline purgative, and kept moist by the diet or some appropriate medicine, while advantage will frequently be found by the administration two or three times daily of a drench containing liq. ammon. acet., spiritus æther, nitr., and nitre, or in more protracted cases small and repeated doses of colchicum may be better. Locally, all stimulating agents—the usually resorted-to remedies—must be carefully avoided; instead, apply continuously some cooling or evaporating lotion, or hot-water applications, and keep the animal quiet. In the second or third stages of the disease these may be supplanted by counter-irritation, through blistering or the insertion of setons: by this treatment the joint may not in every case be restored to its original structural or functional integrity, but may become so serviceable as to allow of the animals being fattened for the butcher. Of more importance, however, than the treatment of the diseased is the attention which may be directed to prevent its occurrence, or at least mitigate the severity of its attacks. The first consideration is the selection of animals. Whether cattle or sheep, this must be proceeded to with caution and judgment, more especially if intended for breeding purposes. The possession of a pedigree, handsome form, fine skin, and proper quality and description of wool, are all desirable points, but not the whole, as I have known animals possessing all these, and well known to have descended from a delicate family. *Constitution* must, above every other consideration, have the pre-eminence, as no amount of symmetry of form, purity of blood, or exactness of outline in the parents can compensate for a delicate and unhealthy constitution in the offspring. Although it does not appear that any one has as yet been able to detect with such nicety as in the human family those unmistakeable characteristics of a scrofulous tendency, still there are certain points which as unmistakeably stamp an animal as objectionable because of an unhealthy disposition, as others which give him favour in our eyes as of a superior class, and in the enjoyment of the most vigorous



health. I do not suppose there is any one who, knowing even little of sheep, would select as fit for breeding an animal with a thin neck, narrow chest, pot belly, narrow loins, tender eyes, fine wool sparingly distributed about the head, belly, and legs, and of very small bone.

There is one other safe and certainly correct way to a conclusion in the matter of hereditary disease—and that is, a strict investigation into the breeding of the animals, the manner in which they have been reared, and the prevalence or absence of those constitutional diseases we have most to dread, the scrofulous and rheumatic, for there cannot be a doubt but that some stocks are more subject to these than others. I have already remarked that good stock are only remunerative, not merely when their breeding is attended to with care, but further when there is maintained a just relationship between the animals possessed and the treatment they are subjected to—when there is a proper adaptation of external circumstances to the constitutional peculiarities we are dealing with. In other words, it is utterly useless the possession of well-developed, high-bred stock, unless they are treated in accordance with their breeding and development. The individual who attempts the experiment of breeding or rearing such on exposed, ill-drained, poor lands, with deficient house accommodation, can scarcely expect to succeed. Still, there are some whose position is not so bad as this, and who, not content to accept the experience of others, have only been taught the lesson of the impossibility of accomplishing ends without the possession of adequate means by repeated failures and grievous disappointments. Again, whether you are selecting or rearing animals for breeding, see that they are not impaired in regard to their reproductive functions by improper or excessive feeding. Ever remember that they may be deteriorated by what appears a simple matter—they may be too fat. I am well aware the inducements to err in this direction are all but overpowering: condition covers many defects: still, although the fat animal may please the eye better, he is certainly neither so sure nor so healthy a stock producer as the one in moderate condition. Excessive obesity is decidedly a diseased condition: such animals are neither in such a vigorous state of health themselves, nor are they capable of producing progeny of as sound a constitution as others not so circumstanced—the very opposite; for there cannot be a doubt but that even individual and acquired conditions of excellency or defect are in two or three generations as transmissible to posterity as those which are inborn.

Upon no account ought stock animals to be reared after the fashion of fat calves or pullets: such coddling and cramming will no doubt give us fat animals, but assuredly neither useful nor profitable. Allow them plenty of good food, with a sufficiency of pure air and exercise, as by these we can best assist in perfecting a sound robust constitution, and a symmetrical, well-developed muscular frame.

*Diseases of Live-Stock in their Relation to the Public Supplies  
of Meat and Milk.*

ALLEGATIONS have, during the last few years, been abundantly made, and have, with the progress of time, become more and more definite, that the flesh of animals slaughtered while in a state of disease, and likewise the milk of diseased animals, are extensively sold for human consumption in the United Kingdom. And the substance of these allegations has been submitted to the Lords of the Council. In 1862, their Lordships ordered an inquiry to be made in this matter, and under their directions I requested Mr John Gamgee, Principal and Professor in the Edinburgh New Veterinary College, to report on it. For their Lordships' purpose, it was likewise desirable that inquiry should be made as to the circumstances under which the more important diseases of stock prevail in the United Kingdom, and particularly into the influence of importation and of home-trade in spreading the infection of such diseases. So Mr Gamgee was instructed to report also on this matter. And he was further instructed to quote in his report any statements credibly made to him as to injurious effects resulting to man from the consumption of the flesh or milk of diseased animals. In order to collect all requisite information for his report, Mr Gamgee was authorised to visit any principal markets and slaughter places in the United Kingdom, as well as any districts where he might believe that disease was particularly rife; and he was further authorised to visit certain parts of the Continent with which our stock-trade is most active, and whence it seemed most possible we might be receiving infectious importations of stock.

Under the above instructions, Mr Gamgee has recently made a report. His evidence is, in substance, as follows;—that disease prevails very extensively in the United Kingdom among horned cattle, sheep, and swine; that the diseased state of an animal not only does not commonly lead the owner to withhold it from being slaughtered for consumption as human food, but on the contrary, in large classes of cases (especially where the disease is of an acute kind), leads him to take immediate measures with a view to this application of the diseased animal, and that, consequently, a very large proportion (Mr Gamgee believes as much as a fifth part) of the common meat of the country—beef, veal, mutton, lamb, and pork—comes from animals which are considerably diseased.

The diseases which figure behind the scenes of our dead meat market are of course various. And although, for the purposes of this report, it is not necessary to enter upon much detail concerning them, yet, in order to discuss their probable effect on the quality of meat, the more important kinds of disease must be separately spoken of. And they are three,—viz., first, *contagious fevers*;



secondly, the so-called *anthracic and anthracoid diseases*; thirdly, *parasitic diseases*.

Of the *contagious fevers* of stock, two are now widely prevalent in the United Kingdom—namely, the *pleuro-pneumonia or lung-fever*, which is peculiar to horned cattle, and the *aphthous fever, or foot-and-mouth disease*, which affects indifferently and in common horned cattle, sheep, and swine. A third disease of the same class—the *small-pox* of sheep, perhaps of all murrains the most dreaded in this country—is not known to be now prevailing among our flocks; but a few months ago, an outbreak of it in Wiltshire excited the greatest alarm; and it is a disease which may at any moment be spreading here. A fourth most important contagious fever of stock—the very fatal *typhoid fever, or steppe-murrain* of Russian horned cattle, has happily been kept away from us for more than a century, partly by the exertions which are made in Russia to limit the disease to those provinces where it is endemic, partly by the strict precautions which are taken at the eastern frontiers of Prussia and Austria to prevent contagious importations; and while this system continues in operation, the *steppe-murrain* is of little practical interest to us.

Of the so-called *anthracic and anthracoid diseases* of stock—diseases which German pathologists have generalised under the name of *milzbrand*, many prevail to a great extent in the United Kingdom, though for the most part as endemic diseases, localised in particular sections of the country. It is said to be an essential character of these diseases, that the blood of the diseased animal undergoes peculiar, in some respects putrefactive changes; but commonly the disease involves an occurrence of local infiltrations and effusions of putrescent blood-ingredients or blood; and in many cases there also occur, either primarily or secondarily, gangrenous changes (erysipelatous or carbuncular) in some superficial solid texture of the body. Diseases of this class are further characterised by the fact, that during their course, the diseased body develops in itself a specific morbid poison, which, by inoculation, can be made to spread the disease to other animals, including man. The diseases which Professor Gamgee counts under the present head are as follows:—the *splenic apoplexy* of horned cattle and sheep, the *braxy* of sheep, the *black quarter* of horned cattle and sheep, the *glossanthrax or tongue-carbuncle* of (almost exclusively) horned cattle, the *forms of anthrax which affect the mouth, pharynx, and neck* in swine, the *apoplexy* of swine, and their so-called *blue-sickness or hog-cholera*, the *parturition-fever* of cows, the corresponding *heaving-pains* of ewes, the *navel-ill* of lambs, and the *red-water* of sheep.

Thirdly, there are the *parasitic diseases* of stock—diseases which consist in the colonisation of the living animal's body by lower animal forms, larval or mature, subsisting at its expense. Such are the following diseases:—the so-called “measles” of the pig, in which disease the *Cysticercus cellulosæ* (larva of the *solium* tapeworm)

is found more or less abundantly diffused through the muscular system, and perhaps in other parts of the animal; the analogous disease of horned cattle, due to the larva of the *T. mediocanellata*; the various, chiefly visceral, diseases of stock which depend on larvæ of the *Tænia marginata* and *T. cchinococcus*; the brain-disease, "gid," or "sturdy," which is due to a larva, mostly of the *T. cœnurus*; the rot of sheep, due to swarms of adult and oviparous fluke-worms (*distoma*) in the liver; the lung-disease, which, especially in calves and lambs, is produced by different kinds of *Strongylus*; the easily overlooked, but highly important disease of swine, which consists in an infestation of their muscular system by the minute immature forms of the *Trichina*.

It is for obvious reasons impossible, in the present state of knowledge, to state in detail what income of morbid product flows from each of the above-mentioned sources into the markets which supply us with food. But from Mr Gamgee's report, together with such other information as he has given me, I gather that, so far as he can learn, the truth is about as follows:—that horned cattle affected with pleuro-pneumonia are, much oftener than not, slaughtered on account of the disease, and when slaughtered, are commonly (except their lungs) eaten; and this, even though the lung-disease have made such progress as notably to taint the carcase; that animals affected with foot-and-mouth disease are not often slaughtered on account of it, but if slaughtered, are uniformly eaten; that animals affected with anthracic and anthracoid diseases, especially swine and horned cattle thus affected, are (except their gangrenous parts) very extensively eaten; that the presence of parasites in the flesh of an animal never influences the owner against selling it for food; that carcasses, too obviously ill-conditioned for exposure in the butcher's shop, are abundantly sent to the sausage makers, or sometimes pickled and dried; that specially diseased organs will often, perhaps commonly, be thrown aside, but that some sausage-makers will utilize even the most diseased organs which can be furnished them; that the principal alternative, on a large scale, to the above described human consumption of diseased carcasses is, that, in connection with some slaughtering establishments, swine (destined themselves presently to become human food) are habitually fed on the offal and scavenger of the shambles, and devour, often raw and with other abominable filth, such diseased organs as are below the sausage-maker's standard of usefulness.\*

This, in general terms, is Mr Gamgee's report on the subject. Disgusting as are the reflections which it suggests, there is not in it, I think, anything intrinsically improbable. For obviously, wherever there is dangerous disease among stock, the owner's commercial

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\* Mr Gamgee's description of the state to which the swine are brought by this diet, raises the question, whether for the purposes of this report they might not themselves properly be classed with diseased animals. See below, p. 250.



instinct will be to make whatever salvage he can; and while he must well know that selling dead stock for meat pays better than selling it for manure, the public has no sufficient safeguard against his yielding unreservedly to that motive. And if, while his stock is suffering with even the most loathsome of diseases, he thinks fit to have each animal as it sickens, or even as it gets moribund, slaughtered and dressed for the market, assuredly there will often not be any effectual obstacle to his carrying that wish into effect.

One doubt, however, may well be raised on the subject. A first popular impression would be, that, if things are as described, pestilences must be bearing witness to the fact. Is it possible—it may be asked—that cattle, having all the foulness of fever in their blood, or having local sores and infiltrations that yield one of the deadliest of inoculable morbid poisons, or having their flesh thronged with larval parasites,—is it possible that such cattle can be converted into human food, and yet not only the immediate scandal of a general poisoning be escaped, but even something not unlike general impunity be the result? Though the affirmative answer to this question may at first sight seem strange, nevertheless it is, with some qualifications, the true one. And doubtless, the impunity, such as it is,—but it perhaps is far less general than it appears,—results from the operation of well-known chemical and physiological laws. Our animal food, before we take it, has for the most part been exposed to so high a temperature that any parasites which had their home in it are killed, and whatever albuminous morbid contagium it contained has been coagulated and made inert. Probably, too, against small quantities of animal poisons—and against such as communicate small-pox and glanders, just as against the venom of the cobra and rattlesnake, the stomach has resources of its own—for any such organic product entering the stomach is at once (as regards that mobile chemical constitution on which its efficiency depends) exposed to the strong disinfectant chemistry of digestion, and thus, within narrow limits of quantity, is likely to be rendered inert before it can soak into living texture. Both these influences may count for something, and the first-mentioned of them for almost everything, in explaining the fact (so far as it is a fact) that many sorts of diseased meat are eaten with impunity. On the other hand it must be remembered, that, in this theoretical explanation, the two protective influences do not cover the whole field of danger;—for, in the first place, not all meat which is eaten has been exposed throughout (nor in every instance even at all exposed) to a temperature sufficient to kill parasites, and coagulate albumen; in the second place, even complete coagulation of albumen may, for aught which we know to the contrary, leave some morbid poisons in operation; in the third place, it may very well be, that, even where cooking can divest a meat of some original specific infectiveness, the meat may still not be susceptible of quite the same digestional changes as healthy meat, when eaten, undergoes. And thus the

theoretical apprehension would be, that with our alleged large consumption of variously-diseased meat, the impunity of consumers, though it were the rule, might be subject to considerable exceptions.

Accurate empirical knowledge in this matter is hitherto only beginning to be gathered, and will not yet warrant any general dogmatic statements as to the effects of diseased meat on human consumers. But for another purpose, as I shall proceed to illustrate, even that scanty knowledge is not sufficient. Supporting, so far as it goes, the theoretical arguments which I have just used as to the possible dangers of the practice in question, it will at least suffice to justify much public caution on the subject. And in this point of view it may be convenient to notice, under separate heads, the evidence which now exists as to the injuriousness of each chief kind of diseased meat.

(a) First, as regards meat which is *infested with parasites*,—we know with absolute certainty that this may become a source of human disease. Every tapeworm found existing in human bowels was once a cysticercus, or other hydatid, nested either in the living muscle or in some other living texture of an animal which is used for food. Tapeworm unfortunately is not a very rare human affection; though how it comes to pass that we not very rarely get to swallow alive those cystic brute-parasites which are larvæ of the intestinal tapeworm, is somewhat difficult to explain. A mouthful of fresh “measly” pork, eaten raw, would of course explain such an occurrence. But the cysticercus cannot outlive being cooked; and as the form of cured ham, bacon, and sausage is the only form in which uncooked pork is even scantily an article of diet among us, it seems probable that cysticerci may outlive some or all of the processes by which meat is commonly cured, and may thus get swallowed alive by persons who eat uncooked sausage, ham, or bacon.

This, however, is not our only concern with the tænia order of brute-parasites. Dogs and other animals which get opportunities of eating the raw offal of slaughter-houses are constantly swallowing live larvæ, which afterwards become mature tapeworms within them. The mature tapeworm, holding fast by its head to the mucous membrane of its host's intestine, sheds from its other end the successive egg-bearing joints which it develops there; and wherever the tapeworm-lodging animal passes, these fertile fragments get dropped in all directions with excrement, and lead of course to a wide and dangerous dispersion of eggs. Often the eggs must find their way into sources of drinking-water, or on to various low-growing vegetables or fruits which are apt to be consumed in an uncooked state by man; and if, with any such vehicle, man swallows a live tapeworm-egg, he immediately has the egg hatched within him, and now in his turn suffers from the larval form of the parasite. Fresh from its egg, the young sexless animal, which he has swallowed, burrows through the wall of his stomach or intestine, and, having thence



migrated to some more or less distant part of his body, grows there, destructively, to its full larval development as a cystic entozoon;—perhaps to show itself one of the sporadic locally sterile cysticerci which are commonest in man's muscle, cellular membrane, eye and brain; or perhaps (and this oftenest in man's liver) to prove itself the pill-box hydatid or echinococcus, and to illustrate one of the most striking stories of so-called "alternate generation," by breeding almost unlimitedly from its own larval substance, as by buds, new cysts which repeat the form and inherit the fertility of their strange sexless parent.<sup>1</sup>

Tapeworms are not the only injurious parasites which man may

<sup>1</sup> It is in Iceland that the saddest experience exists as to the above-described "alternate generations" of the tapeworm. There the diseases which are due to the various stages of various kinds of tapeworm prevail to an enormous extent among both men and cattle. Dr Arthur Leared (who has recently investigated this subject in Iceland, and has kindly permitted me to read the English manuscript of an essay which he has published in Icelandic on the result of his inquiry) says, on the authority of Dr Hjaltelin, of Reykjavik, that a fifth part of the human mortality in Iceland is caused by hydatid disease. And how great is the influence which the dog exerts as an intermediary in propagating such disease, cannot be better illustrated than by the fact of Dr Leared's having suggested, as one of his two measures for preventing the human hydatid disease, that all the dogs of the island should be medically treated for tapeworm. "The evidence against the dog in this matter" (says Dr Leared) "rests upon numerous experiments conducted under circumstances leaving no doubt that tapeworms were produced by feeding them on fresh [hydatid] bladders. The conditions necessary for the propagation of the worm are nowhere so complete as in Iceland. The farmers kill their own meat, and the offal, frequently containing living [hydatid] bladders is the food of dogs. Abundance of mature worms are thus produced. Again, the whole country is one vast pasture, and dogs are universally employed in managing the sheep. These dogs shed everywhere segments of tapeworms, the eggs from which are diffused by rain and melted snow. . . . Each segment is filled with innumerable eggs, invisible to the unassisted eye, which are not set free in the intestine of the dog, but in the outer world, by the decay of the case containing them. It is impossible to say to what extent these eggs preserve their vitality; but so resistant is the outer shell, that I have found them, by examination with the microscope, quite intact after having been steeped for twelve hours in strong sulphuric acid. It seems that desiccation is most fatal to their vitality, and there can be no doubt it is for this reason that sheep are much less liable to staggers in dry seasons and on high grounds, than when the season is wet or their feeding grounds are low and damp. . . . These eggs finding their way into drinking water, or adhering to articles eaten raw, as bilberries or the stalk of the *Angelica*, are swallowed by men. The hands are even liable to be infected from contact with the grass, so that the eggs may easily be swallowed with ordinary food, or from the casual application of the hand to the mouth." The plan on which Dr Leared recommends that the dogs of Iceland should be treated is, that they should all at one and the same time be dosed with *Kamala*, an Indian vegetable drug, which Dr Leared describes to be a very efficient (as well as cheap and tasteless) remedy against tapeworm.

The scope of my report does not allow me to enter upon the history of the singularly interesting inquiries through which, during the last twenty years, the genesiology of parasitic worms has been gradually becoming clear to us. I would only venture to express my deep sense of the services which have been rendered to practical medicine, not less than to exact science, by the researches of Steenstrup, Van Beneden, Küchenmeister, Van Siebold, Stein, Leuckart, and others; and especially by those conclusive experimental investigations which are due to the example and suggestions of Küchenmeister.

receive from the animals which he eats. Quite recently it has been discovered that a microscopical thread-worm, the so-called *Trichina spiralis*, brings, perhaps not very rarely, the muscular flesh of swine into a state in which a small quantity of it, eaten raw, will suffice to destroy life;—viz., that the sexless larval trichinæ, which may be counted by hundreds in any small mass of the diseased muscle, will acquire their sexual development directly they reach alive the stomach of the muscle-eating animal; that, unlike the tapeworm (which commonly sends forth its eggs to hatch somewhere outside the body wherein it dwells), each trichina will breed swarms of young within the intestinal canal of its host; and that these innumerable young, migrating from the animal's intestinal canal to all parts of its muscular system, will create an amount of irritation which often is sufficient to kill. This result has been witnessed, not only among various lower animals whereon the experiment has been abundantly tried, but also quite indisputably in man.<sup>1</sup> And the danger to man is even greater than I have yet said; for pork, in order to be capable of carrying live trichina-larvæ into the stomach needs not to be absolutely raw. Professor Leuckart, a distinguished experimenter on this subject, has found trichina-meat retaining much of its dangerous qualities even when it had to some considerable extent undergone both pickling and smoking.

(b.) As regards possible ill-effects from consuming, in a well-cooked state, the flesh of animals with *anthracic or anthracoid disease*, evidence is still imperfect;—partly, no doubt, because extreme ill-effects do not generally result from such eating, but partly also because, till public attention is drawn to the subject, it must be difficult to trace to their true cause any ill-effects which are thus occasioned. Mr Gamgee tells me that he has experimented on this subject,—and that dogs and ferrets, to which he has given (cooked)

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<sup>1</sup> See especially in Virchow's Archiv, vol. 18, papers by the Editor and by Prof. Zenker of Dresden. Prof. Zenker incidentally mentions, that among 136 post-mortem examinations which he made during eight months of the year 1855, he found four subjects evidently affected with trichina. He gives in detail the case of a farm girl who died under his observation in 1860, killed by trichinæ. She had a month before been taking part with the other farm-servants in a particular pig-sticking and in the consequent processes, and had probably (according to what is said to be a not very unusual practice) taken an occasional pinch of the sausage-meat which she had to chop. She soon fell ill, and died in five weeks. Her bowels contained swarms of adult trichinæ, and the voluntary muscles throughout her entire body were colonised by myriads of larvæ. It appeared on inquiry that other persons who took part in slaughtering the same pig also suffered, and that, though none died, two were bed-ridden for weeks. Microscopical examination of products which were remaining of the slaughtered pig—ham, sausages, and black puddings—showed in them innumerable dead trichinæ. [While the present report is being printed, a contemporary number of Virchow's Archiv (vol. 27, p. 421) contains a paper by Dr C. Tüngel of Hamburg, giving particulars of a case in which certainly one death was caused, and perhaps also a second death, as well as some not fatal illness, by the consumption of trichinous pork on board ship. Of the two deaths, one occurred on the 24th, the other on the 27th day after that on which the pig was slaughtered, and the consumption of its flesh begun.—July, 1863.]



various parts of animals slaughtered during splenic apoplexy or parturition fever, have died in consequence of the meal ; but, on the other hand, M. Renault—formerly Director of the Imperial Veterinary College at Alfort—is quoted,<sup>1</sup> as believing that meat from carbuncular animals is harmless. It seems to me that in this question, which concerns so many diseases and so many different stages of disease, somewhat extensive investigations are wanted, to fix accurately the limits between safe and unsafe consumption. But that human life may, under some circumstances, be endangered through the use of cooked meat derived from animals with anthrax, seems to be conclusively shown by the following case, with which Mr Keith, senior surgeon of the Aberdeen Royal Infirmary, has favoured me :—“In the first week of November 1840, on the farm of Mr G——, near K——, in Aberdeenshire, a two-year old quey was observed to be unwell, supposed to be threatening the ‘quarter-ill.’ She was in consequence slaughtered by the ploughman, aided by a neighbouring blacksmith. On skinning the animal the flesh generally presented a healthy aspect, except that here and there round, black, ecchymosed spots, quite circumscribed, were visible over the carcass. When these patches were cut out the meat seemed so healthy to look at, that the owner resolved to salt it down as his winter mart, a portion of the animal being reserved for present use. A boil of this beef was cooked next day in a pot of broth to dine the whole family, consisting of eleven individuals—father, mother, six grown-up sons or daughters, an aunt, horseman, and housemaid. Of the eleven, two, viz., the father and the servant, did not partake of either the beef or the broth, and these both remained well, while the other nine who partook more or less largely of both were soon after seized with such alarming symptoms of poisoning that a medical man was at once called in. The symptoms he found most urgent were dead sickness, with vomiting, great prostration of strength, soon followed by looseness of the bowels. By active evacuants, followed by the free use of stimulants, and that succeeded by quinine, seven recovered in a few days, but one daughter died on the fourth day, and the mother sank on the fifth, both in a typhoid state. On the 12th of November 1840, the ploughman, James Robertson, who slaughtered the said cow, and the blacksmith, Alexander Andrews, who assisted him, were admitted into the Royal Infirmary of Aberdeen, under the care of Dr Keith, both labouring under phlegmonous erysipelas of one arm each, with high fever and delirium. No wound or open sore could be detected on the ploughman’s hand or arm to account for inoculation, but it was surmised that he had partaken of the meat ; but in the case of the blacksmith, who had not tasted the meat, he pointed to a large malig-

<sup>1</sup> See Virchow in his *Handbuch der Pathologie und Therapie*, vol. ii. p. 97. See also Chevallier, *Dictionn. des Altérations et Falsifications des Substances Alimentaires, Médicamenteuses et Commerciales*, vol. ii. p. 55.

nant pustule on the knuckle of his left, much swollen thumb, and stated that he had cut that knuckle while in the act of skinning the cow. Gangrene seemed imminent in both arms, from the finger tips to the axilla, vesications having already risen at various places; free and deep incisions instantly relieved tension; hæmorrhage from the cut vessels soon subdued the febrile excitement. One smart calomel purge, and then recruiting. The one was dismissed cured at the end of twenty-two, and the other at the end of twenty-six days. These parties communicated the whole circumstances of the case to the writer, and already, before they came to the hospital, the two victims were dead. It was further stated that the offal of the cow was cast into a dunghill, to which two grown swine had access. These ate of it freely, were taken ill, and both died. These facts are to depend on. The one point on which I am in doubt is as to whether it was the mother or the aunt that was the second victim; but that two died there is no doubt. The affair created a great sensation in the district, and has hindered a repetition of any similar occurrence; but it is to be feared it has also led to the more early disposal of the sick cattle for slaughter, to be sent off to some distant market." In a letter of further information which Mr Keith has been good enough to write to me, answering various questions I had asked him, he says:—"I learn that the meat cooked was quite fresh, and healthy to look at, and that the fatal dinner was cooked *on the very day the animal was killed*, so that putrescency had nothing to do with the matter. I further learn that one of the females—the servant—had suspicion that it might not be safe to eat of the meat, and therefore it was that she abstained, and was safe, as already stated. The father habitually abstained from animal food, and did so that day, and escaped. One other of the females only took of the broth, and no beef, and escaped more easily than any of the others."<sup>1</sup>

(c) As regards possible ill-effects from consuming, in a well-cooked state, the flesh of animals which have been suffering an *infectious fever*,—small-pox, typhoid fever, pleuro-pneumonia, or aphtha,—I have no inculpatory evidence worth quoting. And as regards the last two diseases, common as they are in this country, I am of opinion that the absence of evidence is enough to show that immediate ill-effects of any considerable importance do not ordinarily follow the consumption of the meat. Indeed it is certain that on various occasions meat of this description has been consumed on so large a scale that, if the meat had been immediately hurtful, the consequent mischief could not have escaped observation.<sup>2</sup> On the

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<sup>1</sup> Many cases, less circumstantially stated, but generally to the same effect as the above, may be found scattered in journals of veterinary medicine, especially in those of Germany, for the last few years, as well as in older publications. And cases are comparatively numerous where birds, dogs, pigs, and cats have died after taking even small quantities of the blood or offal of recently-slaughtered carbuncular animals.

<sup>2</sup> See instances, in the section which relates to food in Levy's *Traité d'Hygiène*.—



other hand, I must repeat that, till public attention is drawn to such subjects as these, it is difficult to prove connections, which afterwards become evident, between evils and their latent causes. And particularly in this point of view, I must advert again to the unexamined part of this question,—the doubt whether chronic ill-effects (which of course would be singularly difficult to trace) may perhaps result, when febrile meat—meat which necessarily is of modified chemical constitution—becomes a considerable element in diet. An opinion is sometimes expressed, that boils (perhaps with other like affections) are caused in the human subject by the consumption of such meat as I refer to. And though I have not yet found any fact which I can deem conclusive in support of this opinion, I must admit that the alleged connection is not *prima facie* impossible.

(d) Before leaving the subject of cattle-diseases in their relation to the supply of meat, I must mention, as a danger incidental to the consumption of meat from diseased animals, that, in some cases, the meat may be injurious in consequence of the animal having been *excessively drugged during life*. Mr Gamgee mentions cases, where animals recently drugged with arsenic and strychnia have been used for human food. He quotes a very striking case, reported nine years ago in Germany, to the effect that signs of poisoning arose almost as an epidemic among 321 persons who had eaten of the flesh of an ox which during life had been dosed with tartar emetic, and had had perhaps two ounces of that drug; that, of the 321 persons who ate of the ox, 107 suffered, and one of them fatally, from violent gastro-intestinal disturbance; that antimony was chemically found both in the flesh of the ox, and in the interior of the person who died; and that doses of the flesh given experimentally to other animals produced signs of poisoning. Generally it might be expected that no drugging of an animal, in doses not sufficient to poison it, could render its flesh capable of acting as a poison on man.

In conclusion, lest I should seem to have ignored any important existing evidence on the subject of the dangers which are attributable to the consumption of diseased meat, I think it right to observe that, in popular discussions of this subject, and even in some of the medical writings which relate to it, sufficient care has not, in my opinion, been taken to separate two important questions,—the question of meat's being rendered *unwholesome by decomposition*, and the question of meat's being rendered *unwholesome by disease*. Among the cases which I see adduced as illustrations of mischief from diseased meat, are some which, for aught that appears, may only illustrate the well-known fact, that, even in presumably healthy

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I am informed that some years ago during an epidemic of cattle-typhoid (rinderpest) in Bohemia, the poor people had the habit of digging up, for food, the carcasses which the authorities had had buried, and that no harm was observed to result from this practice.

meat, poisonous properties, different from those of common putridity, are sometimes developed by decomposition; and although, for the interests of public health, it is desirable that cases of the latter kind (and, indeed, all cases of alleged injuriousness of food) should receive their due share of attention, yet, for the immediate purposes of the present discussion, they must of course be regarded as irrelevant.

With regard to that minor branch of the inquiry which relates to the MILK of diseased animals,—it appears that, in this country, the most important question is as to the wholesomeness of milk from *animals with aphtha*. Mr Gamgee points out that on some occasions when aphtha has been prevailing among the cattle of a country, the human population in the same places has suffered from the same, or from some similar disorder. And experiment<sup>1</sup> seems to have established as certain, that, at least under some circumstances, the human affection may be caused by the consumption of milk drawn from a diseased animal. It may be<sup>2</sup> that the frequency of such communications of the disease, as compared with the number of persons who (more or less) are consumers of milk, is not great. But the danger is one of which the public ought to be aware. Further inquiry is wanted to ascertain whether the allegation, which has been both made and contradicted, be true or untrue,—that the milk of apthous cows, if used for food (especially by young children, who are likely to be the largest consumers of it), is apt to produce disturbance of the stomach and bowels.

Mr Gamgee in sundry parts of his Report states his belief that a very large proportion of the disease which now habitually prevails among live stock in the United Kingdom, and which he estimates

<sup>1</sup> More than twenty years ago Professor Hertwig published particulars of such experiments performed by him on himself and two friends, with the result of producing a very definite eruptive fever.

<sup>2</sup> See, on this side of the question, the Report which was made to the Préfet of the Seine by M. Huzard fils, in 1839, when aphtha was extensively present in the Paris dairies. Among his conclusions are these:—"§ 41. Quand la maladie a été connue à Paris comme maladie épizootique, il y avait déjà quelque temps qu'elle régnait; elle était à son *maximum* sous le rapport du nombre des bêtes malades; déjà le lait était consommé journellement, et cela, depuis le commencement de la maladie, sans que l'attention, eût été appelée par quelque dérangement dans la santé publique.

"§ 42. Dans les années 1810, 1811, 1834, et 1835, où la même maladie avait régné à Paris, il n'y avait eu aucune précaution prise pour interdire la vente du lait; cet aliment avait été consommé comme dans les années ordinaires, et aucune épidémie n'était apparue.

"§ 43. Dans les provinces où elle régne depuis le commencement de l'année dernière, on n'a point interdit la vente du lait, et il n'y a eu aucun accident, aucune affection connue qu'on ait pu attribuer à la consommation de cet aliment.

"§ 44. Le lait des vaches malades, donné au sortir du pis, aux porcs, aux veaux mêmes, n'a point eu d'inconvénient pour ces animaux, et si des veaux ont eu la maladie, il en est qui n'en ont point été atteints après s'en être nourris exclusivement pendant un laps de temps assez considérable."—See *Annales d'Hygiène Publique et de Médecine Légale*, vol. xxii. p. 296.



as proving fatal to stock to the immense pecuniary amount of "more than six millions sterling" per annum, *might, by proper measures, be prevented*,—viz., that the epidemic diseases are due entirely to contagion, originally foreign, against the introduction and spread of which our present precautions are, in his opinion, not sufficient; and that the most destructive endemic diseases are due, partly to local malaria, which improved land-drainage would dispel, and partly to dietetic mismanagement of stock. Though it is not any part of my present duty to enter upon a consideration of the important questions which are here opened, I have felt myself bound to bring these parts of Mr Gamgee's Report under their Lordships' particular notice.

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*Cases in Practice.* By Mr THOMAS SARGINSON, jun., Appleby.

ON the 5th of March 1863, I was requested by Mr Walker of Burrels, to visit a cow which he said was in a "queer way." On my arrival I found my patient to be a white milch cow, about five years old, and only six weeks from the time of calving. At the first glance she appeared to be seriously wounded on various parts of her body, as the blood, or what at the first seemed to be such, was flowing pretty freely. On closer examination, however, I found that the apparent wounds were small orifices which undoubtedly had originated spontaneously, and not from accident. They differed in diameter from about a quarter of an inch to that of an opening no larger than an ordinary pin's head, and were apparently no deeper than the cutis vera. The discharge was not pure blood, but contained a great amount of serum or serous fluid, and it coagulated as it passed down the body, giving to the animal a very disagreeable appearance. It did not flow in a rapid stream, as if some vessel had been injured, but by a continued and slow oozing; no tumefaction existed about these orifices; but what I forgot to mention previously is, that they did not present a regular appearance, but were of various forms, and from those that I could examine, they had jagged edges and surfaces, and conveyed to my mind the idea of ulcers. The positions occupied by these orifices were,—two on the outside of the left thigh, one on the sacral region, two or three smaller ones on the left ribs, one on the neck, and one on the left side of the face. When I first saw her she had, I suppose, been in this state for about a week; and from inquiries I found that they had not broken out gradually, but, strange to say, all, or nearly the whole of them, during a night and the succeeding day. But from the fact that the animal was not suffering from this extraordinary discharge, the owner did not consider it worth while to apply for advice previously. The animal's pulse was slightly atonic, but from any other

appearance excepting the discharge she did not seem to be seriously ill, as the appetite was excellent, rumination regular, dung sufficient in quantity, and of a proper consistence, breathing natural, eyes bright and full, &c. &c. What I considered to have had a great influence in producing this exudation from the skin was, that only about a week before this made its appearance, she had been what is commonly called "signed," a term employed in this district to indicate the ceasing to milk for a certain time previous to calving. As treatment, I ordered some tonic and laxative medicine, and that the places should be dressed three times a day with dilute sulph. acid. About a week after, I saw the owner, and he informed me that the "bleeding" had ceased, and that the cow was apparently all right. I did not hear anything more of the case until the 10th of April, when a messenger came for me to go immediately to see my old patient. I went direct, but found on arrival that she had died about half an hour previously. I was informed that she had done remarkably well until the 9th, the day previous, when a solitary spot had broken out on the upper part of the right shoulder blade; and that besides the bleeding from this spot (which was about the size of a pea), she commenced, about seven o'clock on that night, to discharge a great quantity of blood per anum, and immediately afterwards died. The blood which she had discharged was apparently venous, and was coagulated. I should have liked to have made an autopsy, but from the lateness it was impossible.

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*Vomiting in a Cow.* By the Same.

I DO not believe I am justified in using the term Vomition, as that action is generally understood to originate from the *stomach*, and not from a *duplication*, as is the case in cattle. Without acting as a critic on my own writing, as no doubt there will be plenty both able and willing to do me that kindness, I will proceed to the case in hand, which was that of a milch cow belonging to Mr Ellison of Dufton. He informed me, when he came on the 25th of May last, that the animal had appeared rather dull for some three or four days, and had given less milk; but, on this day, she had commenced to vomit great quantities of food and water—about a peck or more of half-digested food and water. I consequently visited her, and found an immense quantity of food and some liquid lying at the stall head. The general appearance of the animal was dull; the face wore a haggard expression; the pulse was weak, and numbered about 50 per minute; the eyes were sunken, and the left one was evidently suffering from a want of nervous power, which gave to it the appearance of being more sunken than the right; the left ear was paralysed, being quite pendant, and all power of moving it seemed lost. She did not



seem to be in the least affected in the limbs as regards motor power ; the breathing was natural ; she had not voided any dung for about thirty-six hours ; the appetite was pretty good, but whenever she took any thing, either hay or grass, she began within two or three minutes after to moan and gape as if she were really suffering from an emetic, and then she would expel with great force an astonishing quantity of ingesta mingled with water, much more apparently than she had partaken of. She never attempted to ruminate, and had not done so for nearly a week.

I ordered a powerful purgative with stimulants, composed of sulph. magn., 1 lb. ; ol. crot. tig. gtt. xl. ; carb. ammon.,  $\bar{z}$ ss ; a sufficient quantity of fluids to drink, and but little hay or grass as yet.

26th. A trifling improvement is visible. She does not eject quite so much, but still the quantity is great. She has dunged only once since yesterday ; the paralysis of the left ear and eye still continues ; the extremities are very cold ; ordered active purgatives, combined with strong stimulants, every six hours, until catharsis supervenes.

27th. Great improvement ; purging briskly ; continues to expel ingesta, but nothing compared to the first day I saw her ; the milk is almost gone ; instead of giving twelve quarts, she now gives only about a gill. The pulse weak, and about 70 per minute, but still her general appearance is better.

28th. Continues to improve ; pulse still about 70, but firmer ; she has only ejected food once, and that was when she was eructating for cud, which she chewed for about half an hour ; the quantity she lost at each eructation was about the size of an egg ; appetite good ; continues to dung freely ; the eye and ear still paralysed ; ordered strychnine two grains every morning for three days.

On the 31st I visited her, and found that the loss of ingesta was increasing instead of diminishing, although all the other symptoms were good. I now ordered sulph. acid dilut. aromat. twice daily, and ceased to give strychnine. In the course of a few days I saw her, and she was recovering rapidly, regaining strength, and did not eject food at all.

# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### VIVISECTION.

NOT the least remarkable incident in connection with the noise set up two or three years ago, under headings as above, was the way the whole originated. A lurid flash, and then a rumbling thunder, formed the beginning of the bluster.

A charge of useless, inexcusable barbarism was raised against some persons *unknown*. In order, however, that the accusation should not miss its aim, it was hurled at the cultivators of physiological science of all countries; and as our neighbours, the French, have in all modern times been the pioneers amongst veterinarians in that science, they were made to bear the shock of the charge, whilst we behind the scenes were only threatened by the rebounding missiles.

At the outset, we here declare ourselves opposed to all such acts of inflicting pain on animals as are perpetrated for the instruction of students in the art of operating; and we know and deplore that a remnant of old custom is still retained by our neighbours the French, which we hope soon to see entirely abandoned.

Having said this much, we thoroughly disapprove of the way by which some of our countrymen have sought popularity in making the stir about this question, and adopting language and measures which we believe to be opposed to such modes as on other occasions have been found conducive to the mutual good feeling of people of different nations.

It is upwards of forty years since we first went across the Channel to see veterinary practice amongst our neighbours, and we unhesitatingly say, that no single year has passed since that time in which we have not added to our professional knowledge through cultivating their friendship, and, at the same time, adopting some of their methods of practice.

As this periodical is professedly devoted to the advancement of



veterinary science, serving no party, and withholding nothing that seems worthy of communicating to its readers, and which comes within its scope, neither do we decline to speak freely on all matters which interest the public and the profession alike ; and if there be any occasion in which international work and influence are required to be brought to bear, we always strive to cultivate the best influences, but have thoroughly objected from the first, to the mode of agitation set up, in order to put down what was pronounced as fiendish cruelty, coupling with that and other epithets, cherished names of philosophers, whose ashes repose, whilst their names and teachings live in the minds and hearts of men.

If this question was to be made a public one, it is regrettable that the public should not have had the benefit of all available evidence from both sides. The veterinary profession of England, through the principal of its oldest school breaking out and uttering strong language, and then turning public informer, and becoming the mouth-piece to a deputation to the Emperor of the French, was ill requiting the civilities we as a professional body had received, from fellow institutional bodies abroad.

Had appeal been made in the way Richard Cobden set about his work, first by putting things right, and in an intelligible way, at home, how different might have been the result : like as in his case, the messenger of good would have found open house, and have been the welcome guest of the men whom it should have been the great object to persuade and not abuse.

We can conceive the Emperor of the French receiving a Cobden, a Bright, or a Gurney, and the courtesy he would show. But when seeing a Professor from a college going to assail a host of great names—names of some men no longer in being—we can figure to ourselves the great connoisseur of men putting his finger to his lip, and saying, I will inquire into the matter. And accordingly the Emperor did send the matter for investigation, back to where alone the whole may be dispassionately gone into.

As Englishmen and Scotchmen, we should give a free open worker for the good of humanity a warm reception when coming amongst us ; very different would be the case, however, if we learned that some person, constituting himself the mover of a party, was seeking an audience of our Queen for the purpose of direct interference in the modes of instruction pursued at our incorporated institutions, calling us fiends ; we should then, I think, begin to inquire who is

this, our accuser? And if the man had never before been heard of in connection with laudable works, we should look on him as an intruder, and may be an impostor.

Old customs cannot be swept away in a bluster; men are jealous of having changes abruptly forced on them, and above all foreign interference requires to be discreetly managed.

To go into all the requirements for amendment in veterinary education and practice in our country which largely concerns the public would be beyond our bounds here.

In comparing the systems pursued relatively by different nations, or at different epochs in the cultivation of medical science, be it in its application to man or brute, liberal feelings are required to be exercised no less than appropriate language.

We have only to look back a little, to call to remembrance the time when surgeons cut off many limbs which they happily save now; and are we justified in abusing those who preceded in the good cause? or is any one right in assigning motives as in any way concerned in the former state? No; changes have been brought about by that universal concurrence of influence which results from the cultivation at home and abroad of charitable sentiment.

We personally are largely indebted to our Continental brethren, and publicly have to express thanks, for the liberal manner in which some of the students, from the New Veterinary College have been treated whilst staying at the Veterinary College at Alfort during the present summer, as has been the case on various former occasions when we have recommended others to pass their leisure summer months there, and also at the Lyons school.

None of the good and conscientious people, who are always to be found in numbers where the cry of cruelty is raised, seem to have taken the necessary independent course for instituting inquiry regarding the origin of that first hue and cry, whilst causes and motives were as pertinent to the case, in order to elicit truth, as were facts in connection.

At the time such unmeasured language was given forth—which charged men with fiendish cruelty, who in the cause of humanity were devoting their learning, labour, and time for the good of all—we stood aloof. Even assuming that a case existed which rendered recourse to international correspondence advisable, the way this vivisection question was raised could not fail of indisposing such men to take part in it, as understood most about the subject,



and who were able to see through, to say the least, the exaggerated statements.

The first impression which occurred to us, led to the reflection and interrogation as to who were bringing these accusations, as insulting to our neighbours as they were unjust towards the scientific men of our own country?

We at once turned our minds in search of right views, to that source which never errs, and read as follows :—“ And why beholdest thou the mote that is in thy brother’s eye, but considerest not the beam that is in thine own eye? . . . Thou hypocrite, first cast out the beam out of thine own eye; and then shalt thou see clearly to cast out the mote out of thy brother’s eye.”

As members of the community, it would seem charitable and right, to feel that people of different nations work in diverse ways; as to a less obvious extent, do men of the same country and even in contiguous localities. And it is by these varied means, actions, and modes of thinking, that, under the laws of Providence, knowledge advances.

Had not the veterinary colleges of France been established, setting examples and diffusing knowledge to the rest of the world as they did, where would our veterinary schools have been? And when or where have we had a veterinary college comparable to those in France, whether estimated by the means provided for multiplying veterinary science and art, or by the amount of common good which has resulted?

Had we not devoted years, though with results immeasurably below our aims, in constant endeavours to diminish suffering and loss of life amongst the lower animals, we should not have ventured to express ourselves so freely on the matter; moreover, long intercourse with the scientific veterinarians of France, as well as with those of other countries, enables us to reject the epithets used, as illiberal, wrong, overbearing, and not calculated to lead to any good end.

It was under the influence of the above convictions that we took our stand in defence of laudable works, and in opposition to men who, despising work, try to cloak idleness and negligence, by raising a cry against those who strive to advance good works, and against the very institutions which have shed the light by which all of our time have travelled.

As we wish to place the question fairly before our readers, that they may know the feelings which this subject has elicited, we give,

without comment, articles from several journals, amongst which will be found one from the most influential of all.

In conclusion, we declare to be no partisans of the inflictors of pain only to the extent of cases where the object is to abbreviate its duration in the animal, or the prevention and diminution of it in others. There is, moreover, the further and first object, where the end justifies the means—viz., as it relates to the science of hygiene and medicine applicable to man himself; for, as we once heard a learned London magistrate say, “unless we permit experiments on animals, we must submit to be experimented on ourselves.”

Death, it should be remembered, is by the laws of life preceded by pain, which is in no other animal usually prolonged to the same extent as it is in man.

It is worthy of remark, that the number of animals said to be slaughtered under experiment at the French veterinary schools, and which suffer pain more or less acute and protracted, may be numbered and counted, probably by scores, or say some hundreds, spread over each year; yet, what are these compared to the thousands of horses alone, which work from year to year in agony in this country; which afford evidence of barbarism, not done to enlighten men, but which prevails through the domination of ignorance, and is associated with no redeeming good; and yet, strange to say, this state of things, entailing suffering which, if understood, would make men shudder, has failed to stir the indignation at home which it merits. If we take our stand in the thoroughfares of the cities and great commercial centres of this kingdom, we may observe more lame horses within the space of an hour than could be seen in a similar position in Paris in a week; and a greater number of lame horses, which represent suffering and loss, may be seen in the metropolis of England than could be found in the whole of France; and to this we pledge our veracity. Therefore, for one amongst other reasons why we disapprove of the language used and the steps taken, is because those who took so active a part in heading a pious mission should have first done their duty, as it was incumbent, to diminish animal suffering at home; but to implore the French Emperor to interfere directly with the men of learning in his own dominions was an unprecedented measure, and those who took such part should have gone with clean hands. The respect due to those with whom we should feel proud to be in accord, for the sake of common good, should alone have made men more modest, as well as more charitable, before having



recourse to language and means so contrary to good taste, on the part of professional men of one country towards those of another.

Facts which show that the French were the originators of veterinary science, and that for many years they were its chief and almost sole cultivators, entitles them to that respect from all right-thinking men which they everywhere command; and even down to the present time they hold the very first place as scientific, and also as practical veterinarians;—to use a trite English phrase, “They took the lead, and have kept it.”

To the French veterinarians is pre-eminently due the merit of preventing animal suffering; and by them comparative anatomy, and all that the higher aims of philosophy aspire to, in the investigation of nature’s grandest works in the animal economy, have been in an eminent degree set before the world.

Therefore the English veterinarian who goes amongst his brethren across the channel with any other than feelings of profound respect, fails to take the most effective means to advance the cause of humanity.

Co-operation and mutual good feeling amongst scientific men of different nations, are the first requirements for the advance of science, and as the result, a knowledge of ourselves and others.

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## PERISCOPE.

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### THE CROONIAN LECTURE ON THE COAGULATION OF THE BLOOD.

*Delivered before the Royal Society, June 11, 1863.*

By JOSEPH LISTER, Esq., F.R.S., F.R.C.S., Professor of Surgery in the University of Glasgow.

*(From the Lancet, August 8 and 15, 1863.)*

MR PRESIDENT AND GENTLEMEN,—The subject on which I have the honour to address you this evening is one which lies at the foundation both of Physiology and Pathology, and, on account of its great importance, has engaged the best energies of many very able men, among whom may be mentioned, for example, such distinguished Fellows of this Society as John Hunter and Hewson; so that it might well seem presumptuous in me to hope to communicate anything new regarding it, were it not that the constant progress of Physiology and the allied sciences is ever opening up fresh paths for inquiry, and ever affording fresh facilities for pursuing them. Indeed, my difficulty, on the present occasion, does not depend so much on the lack of materials as on the complicated relations of the subject, which make me almost despair of being able, in the short time that

can be devoted to a lecture, to give, in anything like an intelligible form, even an adequate selection of the facts at my disposal.

It may, in the first place, be worth while, more especially for the sake of any present who may not be physiologists, to mention very briefly some well-known general facts respecting the constitution of the blood. The blood, if examined by the microscope within the vessels of a living animal, is seen to consist of a liquid and numerous small particles suspended in it. The liquor is termed the "liquor sanguinis," the particles the "blood-corpuscles." Of these corpuscles a few are colourless, and are named the "colourless" or "white corpuscles." The great majority are coloured and cause the red appearance of blood, and hence are called the "red corpuscles." Soon after blood has been shed from the body, it passes from the fluid into the solid form. This depends upon the development in the blood of a solid material termed "fibrin," so called from its fibrous nature, consisting, as examined by the naked eye, of tenacious fibres, and having the same character also under the microscope. These fibres form a complicated network among the blood-corpuscles, and from their tenacity are the cause of the firmness of the clot. Soon after the process of solidification or coagulation is complete, the fibrin exhibits a disposition to shrink, and squeezes out from among the corpuscles entangled in its meshes a straw-coloured fluid termed the serum, very rich in albumen—in fact, very similar in chemical composition to the fibrin, which, in its turn, may be said to be identical chemically with the material of muscular fibre.

The question before us, therefore, is, What is the cause of the development of this solid material—the fibrin? The subject may be looked at in two aspects: first, as to the essential nature of the process of coagulation; and, secondly, as to the cause of its occurrence when the blood is removed from the body.

With regard to the first point, the essential nature of the process of coagulation, different views have been entertained. John Hunter was of opinion that the coagulation of the blood, the solidification of the fibrin, was an act of life—analogous, in some respects, to the contraction of muscular fibre. This, on the other hand, was made very unlikely by the observation of his contemporary, Mr Hewson, that blood may be kept in the fluid state by the addition of various neutral salts, but retains the faculty of coagulating when water is added to the mixture. Mr Gulliver, on one occasion, kept blood fluid, by means of nitre, for upwards of a year, but found that it still coagulated on the addition of water. It seems exceedingly improbable that any part of the human body should retain its vital properties after being thus pickled for more than a year. But here I would wish to make an explanation of the use of this term "vital properties." When employing it, I do not wish to commit myself to any particular theory of the nature of life, or even to the belief that the actions of living bodies are not all conducted in obedience to physical and chemical laws. But it appears that every component tissue of the human body has its own life, its own health, just as we ourselves have; and as the actions of living men will ever retain their interest, whatever views be entertained of the nature of life, so must the actions of the living tissues ever continue to be essential objects of study to the physiologist and pathologist. When, therefore, I use the term "vital properties," I mean simply properties peculiar to the tissues as components of the healthy living body.

Turning now to the other aspect of the subject of coagulation—the cause of the occurrence of that process on the escape of the blood from the living body—we find that here again various theories have been held, which may be divided into mechanical, chemical, and vital. The mechanical theory was, that mere rest of the blood was sufficient to cause coagulation. I say this *was* the theory; but I believe it will be found to be still taught by many, that the cause of the coagulation of the blood in an artery which has been tied is its stagnation in the vicinity of the ligature.

As to the chemical theories, they have been various. One very natural view was, that exposure to the air was the essential cause of coagulation. Mr Hewson believed that this was, at all events, an important element in the cause of the



phenomenon ; and many eminent physiologists and pathologists have held the same view, except that, instead of the air as a whole, the oxygen of the air has been supposed to be the important element.

Sir Charles Scudamore considered that coagulation was greatly promoted by the escape of carbonic acid ; and more recently the evolution of ammonia has been regarded as the essential cause of the change. According to the ammonia theory, due to Dr Richardson of this city, the fluidity of the blood within the body depends on a certain amount of free ammonia holding the fibrin in solution, and the coagulation of the blood when withdrawn from the vessels is the result of the escape of the volatile alkali.

Then as to vital theories. These have been held by many physiologists, among whom may be mentioned Sir Astley Cooper and Mr Thackrah, who, from experiments which they performed, were led to the inference, that the living vessels exert an active influence upon the blood, by which coagulation is prevented ; and Mr Thackrah went so far as to attribute this action of the vessels to nervous influence. The view that the blood is kept fluid by the operation of its natural receptacles has been advocated more recently by Brücke of Vienna, whose essay will be found in the *British and Foreign Medical Review* for 1857. Brücke performed his experiments on turtles and frogs, in which animals the blood remains fluid in the heart for days after death ; and I feel bound to say that some of the facts which he has brought forward seem to me quite sufficient to show that the ammonia theory, whatever amount of truth it may contain, cannot be the whole truth, and cannot explain the fluidity of the blood within the body. For example, Brücke found that, having shed blood from the heart of a living turtle into a basin, and transferred, with a syringe, a portion of that blood into the empty heart of another turtle just killed, the blood thus transferred into the empty heart remained fluid for hours ; whereas, that which was left in the basin coagulated in a few minutes. He also found that blood continued fluid in the heart of a turtle long after the injection of air into the heart through a vein, till the cavities of the organ contained a foamy mixture of blood and air.

Yet it by no means follows that the vital theory and the ammonia theory are necessarily altogether inconsistent. It might be true for anything we could tell, *à priori*, that the coagulation of the blood, when shed from the body, might depend on the evolution of a certain amount of ammonia, previously holding the fibrin in solution, and yet it might, at the same time be true, that the cause of the ammonia remaining in the blood in the healthy vessels might be an action of the living vessels retaining it there. It might be that an action of the living vessels might chain down the ammonia and prevent it from escaping, whereas, when shed from the body, it would be free to escape.

This notion was, I confess, at one time entertained by myself ; and one of my earliest experiments was performed with a view to the corroboration of the ammonia theory as applied to blood outside the body. It seemed to me desirable that further evidence should be afforded of the effect of mere occlusion from air in maintaining the blood fluid. If the ammonia theory were true, then if blood could be shed directly from a living vessel into an air-tight receptacle composed of ordinary matter, it ought to remain fluid. For this purpose I made the following experiments :—I tied into the jugular vein of a sheep a long vulcanized india-rubber tube, adapted by means of short pieces of glass tube at its extremities, both ends being connected with the vessel, so that the current of blood might be permitted to flow through the tube, and then continue its natural course. When it had been ascertained that the blood was circulating freely through the tube—which could be readily done by placing the finger on the cardiac aspect of the vein, which was then made to swell if the circulation was proceeding through the tube—pieces of string well waxed were tied at intervals of about two inches round the tube, which was thus converted into a number of air-tight receptacles containing blood, which certainly had no opportunity for the escape of ammonia. The tube was then removed, and I found, in accordance with the view which I was then disposed to entertain, that the blood, instead of coagulating completely



in a few minutes, as it would have done if shed into a cup, remained partially fluid in these receptacles after the lapse of three hours. But I have since found that if the experiment be repeated in the same way as regards its earlier stages, and if, after a few of the strings have been tied on, the tube be cut across, the blood which is in the part of the tube in the vicinity of the air, just like that which is in the air-tight receptacles, remains fluid in part for two or three hours; in short, that my precautions in ensuring that these receptacles should be air-tight were, in so far as they applied to that object, utterly unnecessary. I mention this partly as an illustration of the deceptions to which one is liable in this inquiry, and partly because the experiment thus modified seems to tell as clearly against the ammonia theory as the original one seemed to tell in favour of it. Those receptacles which had been formed by the application of ligatures before the tube was opened afforded certainly no opportunity for the escape of ammonia, and yet in them the blood coagulated as quickly as in those which had communication with the air—implying that facility for the evolution of ammonia does not in itself affect the process of coagulation at all.

How then, it may be asked, is the persistent fluidity of the blood under these circumstances to be explained? That will become more obvious in the sequel than I can make it at present; but in the mean time I may observe, that there are probably two explanations: one is, the coolness of the tube; and the other (far more important), that the blood, in slipping through this cylindrical tube, had had little opportunity of being influenced by its walls. The portion of the blood that first came in contact with the walls of the tube had coagulated. And it is to be observed, that in these experiments I never found the blood altogether fluid, even after a comparatively short time: there has always been a certain amount of coagulation, and only a certain amount of fluidity. A layer of blood having thus coagulated upon the internal surface of the tube, the fresh blood which continued to flow through it was not brought into contact with the walls of the tube at all, but with their lining of coagulated blood.

It has been long known, that if the blood is stirred with a rod the process of coagulation is promoted. It seemed desirable to ascertain distinctly whether the cause of this was the contact of the foreign solid, or the opportunity given for the escape of ammonia; for it is quite true that in the ordinary process of stirring blood, more or less air is mixed with it. For the purpose of determining this I advised a somewhat complicated experiment, which, however, it may be worth while to mention. I made an apparatus of two portions of glass tube, connected in a vertical position by means of vulcanized india-rubber, the lower portion of the glass tube being also connected by india-rubber with a wooden handle, which handle was provided with an upright piece of wire, from which spokes projected in different directions, so that they would, when moved, act as a churn on any blood contained in the lower portion of tube. When the lower piece of tube was fixed by means of a vice, the flexibility of the india-rubber permitted the churn to be rotated so as to expose the blood to its influence. This having been arranged, I first poured in strong liquor ammoniæ, so as to get rid of any slight acidity which the constituents of the apparatus might be conceived to possess; and then, having poured out the ammonia, filled up the apparatus with water, and boiled the whole in a large glass test-tube till all bubbles of air in any portion of it were expelled. Having then tied into a branch of the carotid artery of a calf a bent tube of small diameter, and having permitted the blood to flow till it escaped at the orifice of the tube, I compressed the artery and passed the tube down through the water to the bottom of the apparatus, and then let the blood flow again, which had the effect of displacing all the water; and when the blood appeared at the top of the apparatus the tube was withdrawn, when two effectual clamps were placed on the vulcanised india-rubber; the india-rubber was then divided between the clamps. The upper portion of the apparatus, the orifice of which was exposed to the air, was set aside and left undisturbed. Having ascertained that the lower portion had been effectually sealed by the clamp, and thus prevented from any opportunity of escape of ammonia, I subjected it to the



action of the churn for a certain number of minutes. It so happened that the blood of that calf was very slow in coagulating. I knew this from previous experiments on the animal, and therefore continued the action of the churn for a considerable time—namely, thirty-seven minutes. I then found the wire enveloped in a mass of clot; and examination of the fluid residue with a needle indicated that the fibrin had been all withdrawn from the blood on which the churn had acted. I did not now examine the other portion of the apparatus which had been set aside; but at the end of an hour and a quarter, when more than double the time had elapsed, I investigated this, and found the blood in it for the most part still fluid and coagulable. Thus the blood in the churn, which from the time it left the artery had no opportunity of parting with its ammonia, coagulated much more rapidly than that in an open vessel. The difference between the two was, that the lower portion of the blood had been freely exposed to the influence of the foreign solid, whereas the other had only been subjected to the action of the wall of the tube.

The same principle may be illustrated by an exceedingly simple experiment which I performed only this very day. Receiving blood from the throat of a bullock into two similar wide-mouthed bottles, I immediately stirred one of them with a clean ivory rod for ten seconds very gently, so as to avoid the introduction of any air, and then left both undisturbed. At the end of a certain number of minutes, I found that, while the blood which had not been disturbed could be poured out as a fluid, with the exception of a thin layer of clot on the surface, and an incrustation on the interior of the vessel, the blood in the other vessel, which had been stirred for so brief a period, was already a solid mass.

I have only lately been aware of the great influence exerted upon the blood by exposure for a very short time to a foreign solid; and I feel that many of my own experiments, and many performed by others, have been vitiated for want of this knowledge. Take, for example, the effect of a vacuum, which was observed by Sir Charles Scudamore to promote coagulation. This has been considered by Dr Richardson as an illustration of his theory, the vacuum being supposed to act by favouring the escape of ammonia. I have lately inquired into this subject, and I feel no doubt whatever, that the greater rapidity of coagulation in a vacuum depends simply on the greater disturbance of the fluid. I made the following experiment:—I filled three bottles such as these from the throat of a bullock, placed one of them under the small bell jar of an air-pump in good order and exhausted it, leaving the other two undisturbed. The blood happened to be slow in coagulating; and at the end of about forty minutes, in the vessels where the blood had been undisturbed, there was only a slight film of coagulum on the surface, whereas the blood under the vacuum was found on examination to have a very thick crust of clot upon it. But during the process of exhaustion the blood had bubbled very much. Indeed, any exhaustion of blood recently drawn which is sufficient to cause the evolution of its gases induces great bubbling, so that the pump cannot be used freely for fear of the froth overflowing. To this disturbance, involving the exposure of successive portions of blood in the bubbles to the sides of the vessels, I was inclined to attribute the more rapid coagulation; but in order to prove the point, I stirred for a few seconds the blood in one of the vessels hitherto undisturbed. After eight minutes I emptied the three vessels. I found that that blood which had not been disturbed at all, either by the vacuum or by the rod, was still almost entirely fluid, only showing a thin crust upon the glass and on the surface exposed to the air. The blood which had been subjected to the vacuum had a thick crust of clot on the surface, and the sides of the glass were also thickly encrusted, but it still contained a considerable quantity of fluid that could be poured out from its interior. But that blood which had been stirred for only a few seconds was a solid mass throughout. In other words, gentle stirring of the blood for a few seconds had much greater effect in producing coagulation than the protracted and efficient exhaustion which was continued for upwards of forty minutes, which was a considerable time after all evolution of gas, as indicated by bubbles, had ceased.



Other experiments, precisely similar in their effect, were performed. I therefore feel no hesitation in stating that the effects of a vacuum, regarding which, indeed, the statements of different experimenters have hitherto been conflicting, afford no evidence in favour of the ammonia theory.

There is another point of very great interest in the history of the coagulation of the blood, which has been supposed to give support to the ammonia theory; and that is, the effect of temperature. It has been long known that blood coagulates more rapidly at a high than at a low temperature, and, indeed, a little above the freezing-point remains entirely fluid. This seemed beautifully in harmony with the ammonia theory, as heat would naturally promote, and cold retard, the evolution of the alkali, and a depression of temperature to near the freezing-point might be reasonably supposed to prevent its escape altogether. Indeed, Dr Richardson mentions as a fact, that ammonia artificially mixed with blood ceases to be given off under such circumstances.

Though thinking it not unlikely that this was the true explanation of the influence of temperature on coagulation, I thought it worth while to subject the matter to experiment. For that purpose I kept the blood of a horse fluid by means of a freezing-mixture, and afterwards by ice-cold water; and when the corpuscles had subsided from the upper part of the blood, I cautiously added to the liquor sanguinis extremely dilute ice-cold acetic acid till it was of distinctly acid reaction, the liquor sanguinis being of a colour that permitted the delicate application of test-paper, which is impossible with red blood. By this means any free ammonia which the fluid might have contained must have been neutralised; yet so long as it was kept in the cold it continued fluid, but when brought into a warm room it coagulated just as a specimen which had not been acidulated. Thus, when there could be no free ammonia in the liquor sanguinis at all, it was still affected as usual by temperature.

This experiment may not be satisfactory to all minds, though I confess it appears so to me; and as this is a point of very great interest, I have sought in another way for evidence regarding it. First, however, I will mention an experiment which will not at once appear to bear on the question of temperature. I drew out a fine glass tube in such a way as to produce a fusiform receptacle continued longitudinally each way into a tube of almost capillary fineness for about two inches, which again expanded at the end. Having squeezed out a drop of blood from my finger, I sucked up a portion into the tube till the receptacle and its capillary extensions were filled. I then broke off the expanded ends, and placed the little tube thus filled in a bath of the strongest liquor ammoniæ. Here certainly the blood was in circumstances in which it could not lose ammonia, but where any change in its amount must be by way of increase, and yet I found, on opening the receptacle by snapping it across after a scratch with a file, that instead of remaining longer fluid than in a watch-glass, the blood in it, being more in contact with the glass, was always more quickly coagulated, while coagulation was still more rapid in the capillary tube, where the blood was still more exposed to the influence of the foreign solid—the greater proximity to the liquor ammoniæ having no influence upon it.

It may perhaps be argued that the drop of blood employed being a small drop, and this small drop having been drawn up by suction into the tube, it might have parted with its ammonia before it got into the tube; but then (and now comes the bearing of the experiment on the effect of temperature) I found, if I placed a similar tube filled in the same way in a vessel of snow, so as not to freeze it, but to keep it ice-cold, the blood in it remained fluid as long as I chose to keep it there. Now, if all the ammonia had left the blood before it was introduced into the tube, cold ought, according to the ammonia theory, to have had no effect in retarding its coagulation; for, according to that theory, cold operates by retaining the ammonia. On the other hand, if we take the other alternative, and suppose that any ammonia which the blood might have contained was still in these tubes, the former experiment proves clearly that the retention of ammonia has no effect in producing fluidity—no effect in preventing coagulation; and if the retention of



ammonia has no effect in preventing coagulation, then cold certainly cannot prevent coagulation by retaining the ammonia, because, even if retained, it would not influence the result. In whatever way we look at them, therefore, these simple experiments prove conclusively that cold maintains the fluidity of the blood in some manner unconnected with any influence it may exert upon ammonia.

Then, again, I varied the experiment in this way. I placed such little tubes of blood in baths of liquor ammoniæ at different temperatures. By careful management, guarding against the volatilisation of ammonia and consequent reduction of temperature, I succeeded in employing satisfactorily a bath of liquor ammoniæ at 100° Fahr., the blood being in the bath within a few seconds of its leaving the vessels of my finger, and I found that the high temperature, though under such circumstances it could not possibly dissipate any ammonia from the blood, yet accelerated its coagulation in precisely the same way as when it was applied to blood in watch-glasses exposed to the air.

It is clear, then, that the promotion of the solidification of fibrin by heat is as independent of the evolution of ammonia as the coagulation of albumen under the same agency. Indeed it seems probable that the two cases are analogous, except that a higher temperature is required in the one than in the other.

When fine tubes containing blood were placed in liquor ammoniæ, the alkali acted only upon those parts which were close to the ends of the tubes; a very small portion was rendered brown by it, and beyond that a little was kept permanently fluid, but the chief length of the blood in the tube was unaffected. Having thus ascertained that ammonia travels so slowly along tubes of this capillary fineness, I thought I might have an opportunity of giving the ammonia theory a fair test by tying such a tube as has been above described into the jugular vein of a rabbit, and filling it directly from the vessel, and then ascertaining whether there was any evidence of retardation of coagulation in the blood thus imprisoned. But I could discover no such evidence, although I sought for it in confirmation of a view I then held. To this, however, there is one special exception to be made—viz., in the case of asphyxia. I found that if two such tubes were filled from the same blood-vessel of a creature, one under normal circumstances, and the other after asphyxia had been induced, there was a most remarkable difference between the rates of coagulation of the blood in the two tubes, the asphyxial blood coagulating very much more slowly than the ordinary blood; but when the asphyxial blood was shed into a watch-glass, and air was blown through it, it coagulated rapidly, showing that in the state of asphyxia there must be some volatile element in the blood which has an effect in retarding coagulation.

Supposing at first that this volatile element must be ammonia, I hoped to be able by chemical means to find evidence of its accumulation in asphyxia, and thus add a fact of great interest to physiology. Imitating experiments previously made by Dr Richardson, I passed air successively through blood and through hydrochloric acid, and then estimated the amount of ammonia acquired by the latter by means of bichloride of platinum. In order to prevent the possibility of the loss of any ammonia, I directed blood from the carotid artery of a calf fairly into a Woulfe's bottle by means of a vulcanised india-rubber tube tied into the vessel, and then drew a certain volume of air through it by means of an aspirating jar, the experiment being performed first before, and then during asphyxia. The same procedure was adopted with a second calf, the animal being in each case under the influence of chloroform, which does not interfere with the development during asphyxia of the peculiarity in the blood above alluded to; but I could not find satisfactory evidence of accumulation of ammonia; and, without going further into the question at present, I may say that it seems much more probable that the effect is due to carbonic acid, which is known to have a retarding influence on coagulation, and which probably accumulates greatly in asphyxial blood.

But in justice to the author of the ammonia theory, and to myself too, who at one time expressed a qualified belief in it, it is but fair to say that this theory is extremely plausible. It has been well shown by Dr Richardson that ammonia is a substance well fitted to keep the blood fluid if it be present in a sufficient quan-



tity. An experiment of my own illustrates very well the same point. I drew out a tube about a quarter of an inch in calibre, so that while for two inches at one end it retained its original width, the rest (some ten inches) was pretty narrow, though far from having the capillary fineness of those before described. Into the thick part I introduced a drop of strong liquor ammoniæ, and then securely corked that end of the tube. The object of this was that there should be a strong ammoniacal atmosphere in the narrow part of the tube. I then opened a branch of a vein in the neck of a sheep, introduced the narrow end of the tube into the vessel, and, pushing it in so that its orifice should be in the current of the main trunk of the vein, tied it in securely. I then removed the cork and made pressure on the vein at the cardiac side, causing the vessel to swell and blood to pass into the fine part of the tube; and before the blood had reached the part of the glass moistened by the ammonia, I put in the cork again and withdrew the tube. In a short time, on introducing a hook of fine wire into the extremity of the tube, I found the blood already coagulated; but on filing off a small portion of the tube, I found the blood there fluid. The portion of blood thus exposed soon coagulated, when, a second small piece of the tube being removed by the file, fluid blood was again disclosed, which again soon coagulated; and this proceeding was repeated with the same results time after time, till, near the thick part of the tube, the ammonia in the blood was so strong as to prevent coagulation altogether.

This experiment illustrates how fitted the ammonia is to maintain the fluidity of blood, and also how apt it is, when present in the blood, to fly speedily off from it, leaving it unimpaired in its coagulating properties; and it must be confessed that the end of the tube sealed with a small clot resembled most deceptively the extremity of a divided artery similarly closed. But although the experiment seems in so far to favour the ammonia theory, it will tell differently when I mention the object with which it was performed. It appeared to me that, if the cause of the fluidity of the blood was free ammonia, then, if I provided an ammoniacal atmosphere in the tube, and introduced blood by pressure directly from the vein into this ammoniacal atmosphere, this blood, lying between the strong ammoniacal atmosphere on the one side and the ammonia naturally present in the blood within the vein on the other side, ought to remain fluid; and if it did remain fluid, this would tend to confirm the ammonia theory by making it appear that the volatile material was the same at both ends of the tube. But, to my disappointment, I invariably found that if I drew away the tube after a few minutes only had elapsed, there was already a clot in its extremity; in other words, the ammonia had diffused from the end of the tube into the blood within the vein as into a non-ammoniacal atmosphere. This experiment alone, if duly considered, would, I think, suffice to show that the blood does not contain enough ammonia to account for its fluidity.

One more experiment, however, may be adduced with the same object. I mounted a short but wide glass tube, open at both ends, upon the end of a piece of strong wire, and connected with the latter a coil of fine silver wire so that it hung freely in the tube. I then opened the carotid artery of a horse, and through the wound instantly thrust in the apparatus so far that I was sure the tube lay in the common carotid, which in veterinary language means the enormous trunk common to both sides of the neck of the animal. The tube being open at both ends, and slightly funnel-shaped at that end which was directed towards the heart, had thus a full current of arterial blood streaming through it. Having ascertained how long the arterial blood took to show the first appearance of coagulation in a watch-glass, I very soon after removed the apparatus, and, on taking out the coil of silver wire, found that it was already crusted over with coagulum. Yet here assuredly there had been no opportunity for the escape of ammonia.

From this experiment it is obvious that there is a very great difference between ordinary solid matter and the living vessels in their relation to the blood. But the same conclusion may be drawn much more simply from experiments which I had the opportunity of performing after making an observation which it seems strange should have been left for me to make, and which, I may say, was made



by myself purely accidentally ; and this is, that the blood of mammalia, though it coagulates soon after death in the heart and the principal arterial and venous trunks, remains fluid for an indefinite period in the small vessels. If, therefore, a ligature be tied round the foot of a living sheep a little below the joint which is divided by the butcher, the foot being removed and taken home with the blood retained in the veins by the ligature, we have a ready opportunity of investigating the subject of coagulation, and of making observations as satisfactory as they are simple. Here are two feet provided in the way I have alluded to. A superficial vein in each foot has been exposed. The veins, I see, have contracted very much since I reflected the skin from them before our meeting ; and I may remark that such contraction, dependent on muscular action, may occur days after amputation, indicating the persistence of vital properties in the veins. Now as I cut across this vein blood flows out, fluid but coagulable. Into the vein of this other foot has been introduced a piece of fine silver wire, and when I slit up the vein you will see the effect it has produced. Exactly as far as the silver wire extends, so far is there a clot in this vessel. Now this experiment, very simple as it is, is of itself sufficient to prove the vital theory in the sense that the living vessels differ entirely from ordinary solids in their relation to the blood. It is perfectly clear that by introducing a clean piece of silver wire (and platinum or glass or any other substance chemically inert would have had the same effect) I do not add any chemical material or facilitate the escape of any, and yet coagulation occurs round about the foreign solid.

Again, if a blood-vessel be injured at any part, coagulation will occur at the seat of injury. As a good illustration of this, and also as bearing upon the ammonia theory, I may mention the following experiment. Having squeezed the blood out of a limited portion of one of the veins of a sheep's foot, and prevented its return by appropriate means, I treated the empty portion with caustic ammonia, the neighbouring parts of the vein being protected from the irritating vapour by lint steeped in olive oil. After the smell of ammonia had passed off, I let the blood flow back again, and left it undisturbed for a while, when I found on examination a cylindrical clot in the part that had been treated with ammonia, while in the adjacent parts of the same vessel the blood remained fluid. I repeated this experiment several times, and always with the same result ; where the ammonia had acted there was a clot. The chemical agent used here was one which, so long as any of it remained, would keep the blood fluid ; yet its ultimate effect was to induce coagulation, the vital properties of the vein having been destroyed by it.

If a needle or a piece of silver wire is introduced for a short time into one of the veins of the sheep's foot, it is found on withdrawal to be covered over with a very thin crust of fibrin ; whereas the wall of the vessel itself is never found to have fibrin or coagulum adhering to it, unless it has been injured. Now this seems to imply that the ordinary solid is the active agent with reference to coagulation ; that it is not that the blood is maintained fluid by any action of the living vessels, but that it is induced to coagulate by an attractive agency on the part of the foreign solid. We see at any rate that the foreign solid has an attraction for fibrin which the wall of the vessel has not.

And yet I own I was at first inclined to think that the bloodvessels must in some way actively prevent coagulation. There were two considerations that led to this view ; one was that the blood remained fluid in the small vessels after death, but coagulated in the large. Now why should that be ? It seemed only susceptible of explanation from there being some connection between the size of the vessel and the circumstance of coagulation. It looked as if in the small veins the action of the wall of the vessel was able to control the blood and keep it fluid, but that the large mass in the principal trunks could not be so kept under control. The other circumstance was the rapid coagulation of a large quantity of blood shed into a basin. Why should this occur unless there was some spontaneous tendency in the blood to coagulate ? It seemed scarcely credible that it was the result of contact with the surface of the basin.

Both these notions, however, have since been swept away. In the first place,



I have observed recently that it is by no means only in small vessels that the blood remains fluid after death. If blood be retained within the jugular vein of a horse or ox by the application of ligatures, either before or after the animal has been struck with the poleaxe, it will often continue fluid, but coagulable, in that vessel, which is upwards of an inch in diameter, for twenty-four or even forty-eight hours after it has been removed from the body. I say often, but not always. The jugular vein seems to be in that intermediate condition, between the heart and the small vessels, in which it is uncertain whether it will retain its vital properties for many hours, or will lose them in the course of one hour or so. Unfortunately for my present purpose, it happens that in this jugular vein, removed from an ox six hours ago, coagulation has already commenced, as I can ascertain by squeezing the vessel between my fingers. But now that I lay open the vessel, you observe that the chief mass of its contained blood is still fluid, and we shall at all events have an opportunity of seeing that what is now fluid will in a short time be coagulated. It is an interesting circumstance with reference to the question which we are now considering, that the coagulation always begins in contact with the vein, indicating that it is not the wall of the vessel that keeps the blood fluid, but that, on the contrary, the wall of the vessel, when deprived of vital properties, makes the blood coagulate.

The observation of the persistent fluidity of the blood in these large vessels furnished the opportunity of making a very satisfactory experiment, which I hoped to have exhibited before the Society, but as there was some clot in the vein I did not think fit to run the risk of failure. The experiment is performed in the following way. A piece of steel wire is wound spirally round one of the veins in its turgid condition, and with a needle and thread the coats of the vessel are stitched here and there to the wire, care being taken to avoid puncturing the lining membrane, and thus the vessel is converted into a rigid cup. Two such cups being prepared, and the lining membrane of the vein being everted at the orifice of each so as to avoid contact of the blood with any injured tissue, I found that, after pouring blood to and fro through the air in a small stream from one venous receptacle into the other half a dozen times, and closing the orifice of the receptacle to prevent drying, the blood was still more or less completely fluid after the lapse of eight or ten hours. On the other hand, if a fine sewing-needle is pushed through the wall of an unopened vessel so that its ends may lie in the blood, it is found on examination, after a certain time has elapsed, that the needle is surrounded with an encrusting clot. It is scarcely necessary to point out how entirely the ammonia theory and the oxygen theory, as well as that of rest, fail to account for facts like these.

While the blood may remain fluid for forty-eight hours in the jugular vein of a horse or an ox, it coagulates soon after death in the heart of very small animals, such as mice ; so that it is obvious that the continuance of fluidity in small vessels is not due to their small size.

It is a very curious question,—What is the cause of the blood remaining so much longer fluid in some vessels than in others ? I believe that we must accept it simply as an ultimate fact, that just as the brain loses its vital properties earlier than the ganglia of the heart, so the heart and principal vascular trunks lose theirs sooner than the smaller vessels of the viscera, or than more superficial vessels, be they large or small. We can see a final cause for this, so to speak. So long as the heart is acting, circulation will be sure to go on in the heart and principal trunks ; whereas, on the contrary, the more superficial parts are liable to temporary causes of stagnation, and occasionally to what amounts to practical severance from vascular and nervous connection with the rest of the body ; and it is, so to speak, of great importance that the blood should not coagulate so speedily in the vessels of a limb thus circumstanced as it does in the heart after it has ceased to beat. Were it not for this provision, the surgeon would be unable to apply a tourniquet without fear of coagulation occurring in the vessels of the limb. As an illustration of the importance of a knowledge of these facts, I may mention a case that once occurred in my own practice. I was asked by a



surgeon in a country district to amputate an arm of which he despaired. The brachial artery had been wounded, as well as veins and nerves, and at last, being foiled with the hæmorrhage, he wound a long bandage round the limb at the seat of the wound as tightly as he possibly could. It had been in this condition with the bandage thus applied for forty-eight hours when I reached the patient, and the limb had all the appearance of being dead. It was perfectly cold, and any colour which it had was of a livid tint. But having been lately engaged in some of the experiments which I have been describing, and having thus become much impressed with the persistent vitality of the tissues and the concomitant fluidity of the blood, I determined to give the limb a chance by tying the brachial artery. Before I left the patient's house he had already a pulse at the wrist, and I afterwards had the satisfaction of hearing that the arm had proved a useful one.

One of the two arguments in favour of activity on the part of the vessels, as a cause of fluidity of the blood, having been completely disposed of, let us now consider the other—viz., the rapid coagulation of blood shed into a basin, appearing at first sight to imply a spontaneous tendency of the blood to coagulate, such as would have to be counteracted by the vessels. This, also, has proved fallacious.

In the first place, it appears that the coagulation, after all, does not go on in a basin so suddenly as one would at first sight suppose, but always commences in contact with the foreign solid. When blood has been shed into a glass jar, if, on the first appearance of a film at the surface, you introduce a mounted needle, curved at the end, between the blood and the side of the glass, and make a slight rotatory movement of the handle, you see through the glass the point of the needle detaching a layer of clot, whatever part you may examine. The process of coagulation having thus commenced in contact with the surface of the vessel into which the blood is shed, may, under favourable circumstances, be ascertained to travel inwards like advancing crystallisation towards the centre of the mass. It appears, however, that this extension of the coagulating process would not take place had not the blood been prepared for the change by contact, during the process of shedding, with the injured orifice of the bloodvessel and with the surface of the receptacle. I have only very recently become acquainted with the remarkable subtlety of the influence exerted upon blood by ordinary solids. I was long since struck with the fact, that if I introduced the point of an ordinary sewing-needle through the wall of a vein in a sheep's foot, and left it for twelve hours undisturbed, the clot was still confined to a crust round the point of the needle, implying that coagulum has only a very limited power of extension. I thought, therefore, that by proper management it might be possible to keep blood fluid in a vessel of ordinary solid matter lined with clot. But various attempts made with this object failed entirely, till I lately adopted the following expedient:—Having opened the distal end of an ox's jugular vein, containing blood and held in the vertical position, taking care to avoid contact of any of the blood with the wounded edge of the vessel, I slipped steadily down into it a cylindrical tube of thin glass, somewhat smaller in diameter than the vein, open at both ends, and with the lower edge ground smooth in order that it might pass readily over the lining membrane, and so disturb the blood as little as possible by its introduction, and influence only the circumferential parts of its contents. The tube was then kept pressed down vertically upon the bottom of the vein by a weight, in a room as free as possible from vibration, and I found, on examining it at the end of twelve hours, that the clot was a tubular one, consisting of a crust about one-eighth of an inch thick next the glass and the part exposed to the air, but containing in its interior fluid and rapidly coagulable blood. In another such experiment, continued for twenty-four hours, though the crust of clot was thicker, the central part still furnished coagulable blood.

But it may perhaps be argued by those who say that the bloodvessels are active in maintaining fluidity, that the small portion of the vein covering the end of the tube was acting upon the blood, which certainly was fluid where in contact with it, the clot being in the form of a tube open at the lower end. To guard against such an objection I made the following experiment:—I extended a tube like that



above described by means of thin sheet gutta-percha, contriving that the internal surface of the gutta-percha should be perfectly continuous with that of the glass tube. The lower part of the gutta-percha tissue was strengthened by a ring of soft flexible wire such as is used by veterinary surgeons for sutures, and the wire was also extended upwards to the top of the glass so as to maintain the rigidity of the gutta-percha portion during its introduction into a vein, but at the same time, from its softness, permit the gutta-percha part to be bent at a right angle after it had been introduced, and so close the orifice of the glass tube with ordinary solid matter. The tube is pressed down by a weight in a vein with blood in the glass portion, while the gutta-percha part closes it below. At the same time I performed a comparative experiment, to which I would invite particular attention, although I am sorry at this late hour to occupy the attention of the Society so long. I tied a thin piece of gutta-percha tissue over the lower end of a similar glass tube, and simply poured blood into it from the jugular vein of an ox. I wished to compare the condition of blood which had been simply poured into a tube with blood which had been introduced without any disturbance of its central parts. But in order to make the experiment a fair one, as it might be said that the blood poured from the vein had been more exposed to the air than that into which the tube was slipped, I proceeded in the following way:—I obtained a long vein containing plenty of blood, and having first filled the second tube with the gutta-percha bottom by simply pouring blood into it from the vein, I cut off a portion of the vein which had been thus emptied, and having tied one end and everted the lining membrane of the other end, and having also everted the lining membrane of the orifice of the remainder of the vessel which was full, I poured the blood from the full portion through the air into the empty part. In doing this I had difficulty in getting blood enough, and it passed through the air in slow drops, and that only when the vein was squeezed by my warm hand. At last, having introduced sufficient for the purpose, I slipped down the compound tube and bent its gutta-percha portion, and left both tubes for awhile undisturbed. At the end of three hours and a half, I found that the blood which had been simply poured in was a mass of clot, and fluid squeezed from it yielded no threads of fibrin, coagulation being complete. How long it had been so I do not know. I did not examine the other blood until seven hours and three quarters had expired, and then found that, just as in the cases where a simple glass tube was introduced, the clot was tubular, and the chief part of the blood was still fluid in its interior, the only difference being that in this case the clot formed a complete capsule, being continued over the gutta-percha instead of being deficient below, as it was when the vein closed the end of the tube. Now, if we consider the two parts of this comparative experiment, we see that the receptacles in which the blood was ultimately contained were precisely similar in the two cases—viz., glass tubes closed below with gutta-percha; and that the blood which was simply poured into the tube was much less exposed to the air than the other, and also was not subjected, like it, to elevation of temperature, a circumstance which promotes coagulation; but yet this blood became completely coagulated in a comparatively short time, whereas the other, after a much longer time, was coagulated only in a layer in contact with the foreign solid. But in the latter case the blood had been so introduced as to avoid direct action of ordinary matter on any but the circumferential parts of it; whereas in the former, though poured quickly, it had run down the side of the glass, and, as a consequence of this almost momentary contact with the foreign solid, the central parts, like the circumferential, underwent the process of coagulation.

Mysterious as this subtle agency of ordinary solids must appear, its occurrence is thus matter of experimental demonstration, and by it the coagulation of blood shed in a basin is accounted for; while it is also conclusively shown from this experiment that the blood, as it exists within the vessels, has no spontaneous tendency to coagulate, and therefore that the notion of any action on the part of the bloodvessels to prevent coagulation is entirely out of the question. The peculiarity of the living vessels consists not in any such action upon the blood,



but in the circumstance (remarkable indeed as it is) that their lining membrane, when in a state of health, is entirely negative in its relation to coagulation, and fails to cause that molecular disturbance, or if we may so speak, catalytic action which is produced upon the blood by all ordinary matter.

I afterwards found that the simplest method of maintaining blood fluid in a vessel composed entirely of ordinary matter was to employ a glass tube similar to those above described, except that its upper end was closed by a cork perforated by a narrow tube terminating in a piece of vulcanized india-rubber tubing that could be closed by a clamp. This tube was slipped down into a vein till the blood, having filled it completely, showed itself at the orifice of the india-rubber tubing, to which the clamp was then applied. The whole apparatus was now quickly inverted, and the vein was drawn off from over the mouth of the tube, which was then covered with gutta-percha tissue to prevent evaporation. After the inverted tube had been kept undisturbed in the vertical position for nineteen hours and three quarters, coagulable blood was obtained from the interior of the clot.

We have seen that a clot has but very slight tendency to induce coagulation in its vicinity unless the blood has been acted on by an ordinary solid ; and it is probable that with perfectly healthy blood it would be unable to produce such an effect at all. This appears to me to be very interesting physiologically, but especially so with reference to pathology. I must not now go fully into the circumstances that led me to it, but I may express the opinion I have formed—that clot must be regarded as living tissue in its relation to the blood. It is no doubt a very peculiar form of tissue in this respect, that it is soft, easily lacerable, and easily impaired in its vital properties. If disturbed, as in an aneurism, it will readily be brought into that condition which leads to the deposition of more clot ; but if undisturbed, it not only fails to induce further coagulation, but seems to undergo spontaneous organization. I have seen a clot in the right side of the heart, and extending into the pulmonary artery and its branches, unconnected with the lining membrane of auricle or ventricle or with the pulmonary artery except at one small spot where it had a slight adhesion, developed into perfect fibrous tissue, by virtue, it would appear, of its own inherent properties. Another observation which I once made, and which then completely puzzled me, now seems capable of explanation. In laying open the bloodvessels of a dead body, I observed in many of the veins a delicate white lace-like tissue which evidently must have been formed from a clot. This I now believe to have had the same relation to the coagulum as the flimsy cellular tissue of old adhesions has to lymph.

It may not be altogether superfluous to mention some other facts illustrative of the active influence of ordinary matter in promoting coagulation, and the negative character of the lining membrane of the vessels. I find that a needle introduced into one of the veins of the foot of a sheep for a much shorter period than is necessary to produce the first appearance of the actual deposit of fibrin upon it, leads after a time to coagulation where the needle had lain : in other words, that a foreign solid, by a short period of action on the blood, brings about a change that results in coagulation, though the blood still lies in the living vessels. I have also ascertained that after blood has been made to coagulate in a particular vessel by introducing a needle into it, if the coagulum as well as the needle is removed, and more fluid blood is allowed to pass in, this blood remains fluid for an indefinite period, showing that the needle had not impaired the properties of the vessel by its presence ; so that the previous coagulation must be attributed, not to any loss of power in the vein, but simply to the action of the foreign solid.

In seeking for an analogy to this remarkable effect of ordinary solids upon the blood, we are naturally led to the beautiful observations of Professor Graham, lately published in the "Philosophical Transactions." He has there shown what insignificant causes are often sufficient to induce a change from the fluid or soluble to the "pectous," or insoluble condition of "colloidal" forms of matter. Indeed Mr Graham has himself alluded to the coagulation of fibrin as being probably an example of such a transition.



There is, however, another remarkable circumstance that must be taken into consideration, of which I myself have been only recently aware, and which may be new to several Fellows of the Society, and that is, that in spite of the influence of an ordinary solid the liquor sanguinis is not capable of coagulating *per se*. It was observed many years ago by my colleague, Professor Andrew Buchanan, of Glasgow, that the fluid of a hydrocele, generally regarded as mere serum, coagulated firmly if a little coagulum of blood diffused in water was added to it; an effect which he was disposed to attribute to the agency of the white corpuscles.<sup>1</sup> I repeated Dr Andrew Buchanan's observations last year, and satisfied myself first that the diffused clot did not act simply by providing solid particles to serve as starting-points for the coagulating process. I tried various different materials in a finely divided state, and found that none of them, except blood, produced the slightest effect. But I found that if a mixture of serum and red corpuscles from a clot was added to some of this hydrocele fluid, it was soon converted into a firm solid mass. If a small quantity of the serum and corpuscles was dropped into the fluid, and allowed to subside without stirring, coagulation rapidly took place in those parts where the red corpuscles lay, while other parts of the fluid remained for a long time uncoagulated. This seemed to indicate that the red corpuscles had a special virtue in inducing the change. I confess, however, that till very lately I was inclined to suppose that in the hydrocele fluid the fibrin must be in some peculiar spurious form. We know that the buffy coat of the horse's blood coagulates in a glass without addition of clot, and we know that lymph coagulates, so that I did not doubt that liquor sanguinis would always undergo the change when influenced by ordinary matter. But an observation which I made not many days ago shows that this was a mistake. I obtained the jugular vein of a horse, and having kept it for a while in a vertical position till I could see through its transparent coats that the red corpuscles had fallen from the upper part, I removed all bloody tissue from that part of the vein, and punctured it so as to let out the liquor sanguinis into a glass. Finding after eighteen minutes that the liquid had not begun to coagulate, I added a drop of serum and corpuscles to a portion of it, and within seven minutes there was a clot wherever the corpuscles lay, whereas the rest of the fluid was still very imperfectly coagulated after another half hour had elapsed. That the liquor sanguinis to which no addition had been made coagulated at all, was sufficiently explained by microscopic investigation, which showed not only abundant white corpuscles, but also several isolated red ones that had not subsided. This observation was made three hours after the death of the horse; but I obtained essentially similar results on repeating the experiment in another horse an hour after death, so that there can be no doubt whatever that the fibrin was in the same condition as it is in the bloodvessels of a living animal. The observation appears also particularly satisfactory on this account, that the liquor sanguinis was not separated from the corpuscles by any process of transudation through the walls of the bloodvessels, which might be conceived to involve retention of some constituent of the liquid, which, though in solution, might be unable to pass through their pores; but simply by the subsidence of the corpuscles, which must have left all the materials of the liquor sanguinis behind them. Hence it is proved beyond question that if the liquor sanguinis could be separated completely from the blood-corpuscles, it would resemble the fluid of hydrocele in being incapable of coagulation when shed into a cup.

Now this struck me as a very satisfactory and beautiful truth, inasmuch as it clears away all the old mystery of the distinction between inflammatory exudations and dropsical effusions. Dropsical effusions, exhibiting little disposition to coagulate, have been supposed to consist almost exclusively of serum, and the exudation of the entire liquor sanguinis has been regarded as the special characteristic of inflammation, and very unsatisfactory theories have been put forward by ingenious pathologists to account for this difference. But it now appears that

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<sup>1</sup> Proceedings of the Glasgow Philosophical Society, Feb. 19th, 1845.



a dropsical effusion like that of hydrocele is undistinguishable from pure liquor sanguinis.

Various dropsical effusions have been lately investigated with reference to their coagulability on the addition of blood-corpuscles by Dr Schmidt, of Dorpat, who finds that while they differ from one another in the amount of water they contain (just as is the case with serum filtered artificially through animal membranes under different degrees of pressure), yet they are all but universally coagulable. Schmidt has also carried the investigation further. He has found that by chemical means he can extract from the red corpuscles a soluble material which, when added to these exudations, leads to coagulation. In other words, he shows that the corpuscles do not act as living cells, but by virtue of a chemical material which they contain, which can be used in the state of solution, free from any solid particles whatever. He found also that the aqueous humour made a dropsical effusion coagulate, and that the same effect was produced by a material extracted from the non-vascular part of the cornea. Hence he regards the blood-corpuscles as only resembling other forms of tissue in possessing this property. These observations are extremely interesting, if trustworthy: and that they are so, I do not at all doubt; but having only read Schmidt's papers within the last day or two, I have not yet had opportunity of verifying his statements.<sup>1</sup>

It remains to be ascertained what share the material derived from the corpuscles has in the composition of the fibrin. Schmidt inclines to the opinion that the fibrin is probably composed, in about equal proportions, of a substance furnished by them and one present in the liquor sanguinis. If this be true, the action of an ordinary solid in determining the union of the components of the fibrin may be compared to the operation of spongy platinum in promoting the combination of oxygen and hydrogen.

It may be asked, how comes it that when the blood of a horse is shed into a cup, the buffy layer coagulates as rapidly, or nearly so, as the lower parts rich in corpuscles?

This is indeed a question well worthy of careful study. We know that the liquor sanguinis left by the subsidence of the red corpuscles within a healthy vein is incapable of coagulating when shed, except in a slow manner, which is accounted for by the corpuscles that remain behind in it. Hence it appears that when the blood as a whole is shed into a glass, the agency of the ordinary solid leads the corpuscles to communicate to the liquor sanguinis, before they subside, a material, or at least an influence, which confers upon it a disposition to coagulate, though it still remains fluid for some time after they have left it. Just as we have seen that a very short time of action of the ordinary solid upon the blood as a whole is sufficient to give rise to coagulation, so we now see that, provided an ordinary solid be in operation, the presence of the corpuscles for but a little while is enough to make the liquor sanguinis spontaneously coagulable, though not immediately solidified. We shall see before concluding an illustration of the importance of this fact to pathology.

It remains to be added, that serous membranes resemble the lining membrane of the bloodvessels in their relations to the blood, as is implied by John Hunter's observation that blood, which had lain for several days in a hydrocele, coagulated when let out. The same thing is well illustrated in a frog prepared like this I now exhibit. About four hours ago, a knife having been passed between the brain and cord to deprive the creature of voluntary motion in the limbs and trunk,

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<sup>1</sup> Since this lecture was delivered I have verified an important observation made by Schmidt—viz., that a given amount of corpuscles causes complete coagulation of only a limited quantity of hydrocele fluid. From this he draws the inference that the action of the corpuscles cannot be of the nature of fermentation, the coagulative efficacy of the corpuscles being not continued indefinitely, but becoming exhausted in the process of coagulation. (For Schmidt's papers, see *Archiv für Anat. Phys.*, &c., 1861 and 1862.)



the peritoneal cavity was laid open in the middle line, and its edges being kept raised and drawn aside by pins, I seized the apex of the ventricle of the heart with forceps and removed it with scissors. In a short time the whole of the animal's blood was in the peritoneum, and it may be seen that it is still fluid in spite of this long continued exposure. When I first performed the experiment, three years and a half ago, the weather being cool (about 45° Fahr.), and a piece of damp lint being kept suspended above the frog to prevent evaporation and access of dust, I found that the blood remained fluid in the peritoneal cavity for four days, except a thin film on the surface, and a crust of clot on the wounded part of the heart; but a piece of clean glass placed in the blood in the peritoneum became speedily coated with coagulum. Here it will be observed not merely the liquor sanguinis, but the corpuscles also were present in the serous cavity; yet no coagulation took place in contact with its walls.

I think it probable, though not yet proved, that all living tissues have these properties with reference to the blood. We know that the interstices of the cellular tissue contain coagulable fluid, and I have seen anasarcaous liquid coagulate after emission; but this, indeed, may possibly have been merely liquor sanguinis, coagulating in consequence of slight admixture of blood-corpuscles from the wounds made in obtaining it.

Looking now at the principal results which we have arrived at, it must, in the first place, be admitted that the ammonia theory is to be discarded as entirely fallacious. The fact that this theory is exceedingly plausible, and has been supported by many ingenious arguments and experiments, is of course no reason why we should retain it if unsound. On the contrary, the more specious it is, the more necessary is it that it should be effectually cleared away; for it mystifies the subject of coagulation most seriously; and I may say, for my own part, that it has cost me an amount of experimental labour of which the illustrations brought forward this evening convey but little idea. Still these have been, I trust, sufficient to show that the coagulation of the blood is in no degree connected with the evolution of ammonia, any more than with the influence of oxygen or of rest. The real cause of the coagulation of the blood, when shed from the body, is the influence exerted upon it by ordinary matter, the contact of which for a very brief period effects a change in the blood, inducing a mutual reaction between its solid and fluid constituents, in which the corpuscles impart to the liquor sanguinis a disposition to coagulate. This reaction is probably simply chemical in its nature; yet its product, the fibrin, when mixed with blood-corpuscles in the form of an undisturbed coagulum, resembles healthy living tissues in being incapable of that catalytic action upon the blood which is effected by all ordinary solids, and also by the tissues themselves when deprived of their vital properties.

These principles have, of course, very extensive applications to the study of disease; but I must content myself with alluding very briefly to inflammation, the most important of all pathological conditions.

If we inquire what is the great peculiarity of inflamed parts in relation to the blood as examined by the naked eye, we see that it consists in a tendency to induce coagulation in their vicinity; implying, according to the conclusions just stated, that the affected tissues have lost for the time being their vital properties, and comport themselves like ordinary solids. Thus, when an artery or vein is inflamed, coagulation occurs upon its interior, in spite of the current of blood, precisely as would take place if it had been artificially deprived of its vital properties. On one occasion I simulated the characteristic adherent clot of phlebitis by treating the jugular vein of a living sheep with caustic ammonia, and then allowing the circulation to go on through the vessel for a while, when, on slitting it up, I found its lining membrane studded with grains of pink fibrin, which could be detached only by scraping firmly with the edge of a knife. Again, comparing an inflammatory exudation into the pericardium or into the interstices of the cellular tissue with dropsical effusions into the same situations, we are struck with the fact that, while the liquor sanguinis effused in dropsy remains fluid, the inflammatory product coagulates. Now we know that in intense inflammation



the capillaries are choked more or less with accumulated blood-corpuscles, which must cause great increase in the pressure of the blood upon their walls ; and from what we know of the effect of venous obstruction in causing dropsical effusion of liquor sanguinis through increased pressure, we are sure that we have in the inflammatory state the physical conditions for a similar transudation of fluid through the walls of the capillaries. And the natural interpretation of the difference in the two cases as regards coagulation seems to be, that whereas in dropsy the fluid is forced through the pores of healthy vessels, in inflammation the capillary parietes have lost their healthy condition, and act like ordinary matter ; so that the liquor sanguinis, having been subjected, immediately before effusion, to the combined influence of the injured tissue and the blood-corpuscles, has acquired a disposition to coagulate just like the buffy coat of horses' blood shed into a glass, or like the frog's liquor sanguinis filtered by Müller from its corpuscles, the injured vessels acting upon the blood like the filter.

This view of the condition of intensely inflamed parts is exactly that to which I was led some years ago by a microscopic investigation, the results of which were detailed in a paper<sup>1</sup> that received the honour of a place in the "Philosophical Transactions." It was there shown, as I think I may venture to say, that the tissues generally are capable of being reduced under the action of irritants to a state quite distinct from death, but in which they are nevertheless temporarily deprived of all vital power ; and that inflammatory congestion is due to the blood-corpuscles acquiring adhesiveness such as they have outside the body, in consequence of the irritated tissues acting towards them like ordinary solids.

I cannot avoid expressing my satisfaction that this inquiry into the coagulation of the blood has furnished independent confirmation of my previous conclusions regarding the nature of inflammation.

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## ON THE "LAMB DISEASE," OF WHICH PARASITES IN THE LUNGS ARE GENERALLY THE CAUSE, OR CONSEQUENCE.

By EDWARDS CRISP, M.D., F.Z.S., late Physician to the Metropolitan Dispensary.

### PRIZE ESSAY.<sup>2</sup>

(Continued from page 511.)

Mr J. COLEMAN, Woburn, Beds., says :—

"Judging from the little I have seen of the disease, I think it has generally arisen from the lambs being taken from their mothers very early, and then not kept very well,—turned, for instance, into old grass that had previously been sheep-fed very much. I have no doubt but that sheep are much more subject to this disease upon wet and undrained clay and low-lying lands than on high dry situations ; and I have been inclined to think that the parasites are the consequence and not the cause of the disease. I don't think the use of artificial manures has anything to do with this disease in particular ; still we well know that grass heavily manured with guano or other dressings is not so healthy for young sheep as when not so treated. The disease prevails more, I fancy, in wet than in dry seasons. Prevention, rather than cure, is the rule that ought to guide sheep-farmers ; and there is no better plan upon old grass-land than to feed the

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<sup>1</sup> On the Early Stages of Inflammation, Phil. Trans. for 1858.

<sup>2</sup> To this Essay the prize of Thirty Pounds, offered by a Committee of Agriculturists in Cornwall, through the medium of the Bath and West of England Society, was awarded by LORD PORTMAN, the chosen adjudicator.

lambs on a small quantity of cake and oats as soon as taken from the ewes, as a strong healthy lamb is rarely affected. I know of no cure medicinally for it."

MR. T. PARNELL, of Bowden, Yealmpton, Devon, who farms largely, says:—

"The disease comes on sometimes before the lambs are shorn, sometimes directly after; the lambs refuse food, and generally die apparently from inanition; but the lungs are congested and the windpipe inflamed. The disease occurs in lambs both in high and in low condition, but the former have a better chance of recovery. Early lambs are attacked as frequently as late. My farm is high and dry, very little of it underdrained, and not heavily stocked with sheep. The disease prevails both on old pasture-land and on artificial grasses; artificial manures, I believe, have nothing to do with it. The best preventive is keeping the lambs well after weaning, and the inhalation of chlorine gas has certainly produced a beneficial effect.—The testimony of the gentleman who furnished this information (through my friend Mr Adkins, surgeon, Yealmpton, Devon) in favour of chlorine is especially valuable, I think, although 16 of his lambs were killed by it. I give the substance of my friend's letter.—The disease was not known in this neighbourhood until lately. The answers are from the largest farmer in this parish. A veterinary surgeon nearly killed his whole lot of lambs by putting them into a close house and making them inhale chlorine gas; it killed 16 instantly. I was in error in saying they never saw the worms. Mr Parnell now tells me he saw bundles of them taken out of the windpipe.—Chlorine is the remedy, I think, if you can carry it sufficiently far, to destroy the worms without killing the patient; all his other lambs so treated are now quite well. They began to improve after the treatment by gaining flesh, and the diarrhoea ceased.—The veterinary surgeon crammed some 24 of them into a very small cheese-house, packed tight, with no means of escape, and without the power of admitting sufficient air to neutralise the effect of the chlorine, as there were no windows and only one door. He had previously tried it in barns, which were too open, and then he went to the other extreme and killed the lambs; but it cured those that could get out directly. Why I know so much about it is, that one of Mr Parnell's labourers in getting the lambs out was very nearly poisoned, and I had the treating of him for a week. He had all the symptoms described as belonging to poisoning by mineral gas,—swelling of the abdomen and throat, great cough, and dyspnoea. The man was always exceedingly delicate in his chest.—The chlorine gas was produced by throwing sulphuric acid (vitriol) on common salt."

MR W. FLATT, Tunstall, Suffolk, has on several occasions sent me lambs for dissection. On a recent visit to him he had five killed for my inspection, and I examined them on the spot immediately after death, before their bodies were cold. He says:—

"I cannot account for the death of the lambs I sent to you. For the last three weeks they have had three different sorts of food in a day, viz., the heath, clover-layer, rye-grass, and trifolium at night, and I have debarred them from each for a day or two, but it makes no difference; they do not appear to suffer pain; they lie quietly, and are sleepy at all times. If you lift them up, they drop again, and they remain in this state until they die. When they die, their blood is like water, or rather like a basin of water that has had a bloody cloth in it; the flesh the morning after they are killed has a copperas-like hue, or it has a yellowish cast; but this is not unusual when lambs are feeding upon trefoil. Some of these died in a few hours; some lived and wasted until they were perfect skeletons; and yet the symptoms were much the same when the lambs were first taken."

I may say here that in all the lambs I examined in June and July 1861, I found worms in larger or smaller quantities in the stomach and in the air-tubes, but, generally, these were insufficient to account for death. These lambs had a large quantity of sand in the intestinal tube. In addition to the watery state of the blood, the liver was soft, of a whitish colour, and the intestinal mucous membrane was also soft and readily detached. My impression is, that the food in this



instance had much to do with the cause of death, although the presence of the worms might have accelerated it. I have examined other lambs from this flock that appeared to die solely from stomach and lung parasites.

Mr J. HEMPSON, Edwarton Hall, Suffolk, who has had a large amount of experience respecting the disease, furnishes the following information, which I quote in full :—

“ I will endeavour to answer your questions as well as I am able.—When I have lost lambs from that serious disease, which has been so prevalent of late years, I have invariably found those thread-like worms in the windpipe and in the air-passages of the lungs ; straggling singly along the former, and in clusters more or less in the latter.—I am much inclined to suppose these parasites to be the cause of the disease. Violent purging invariably accompanies this complaint. You can but judge as to whether irritation produced by the existence of these worms in the respiratory organs could produce a sympathetic irritation in the bowels of an animal. In examining many bodies, I have found a general healthy appearance of the vital organs ; but the small intestines are slightly inflamed, the inner coating or mucous membrane being apparently destroyed. I believe the use of oil-cake, or any other system of high feeding, to be the best safeguard against the disease. I would observe that I have never known lambs affected with the disease while sucking the ewes.—The disease is generally most fatal in farms that are heavily stocked with sheep. In one of the worst cases I have known, the lambs were, at the time of the disease breaking out, feeding on white or Dutch clover in its second growth, having been previously fed off very close with sheep. In one case, that of my own flock, they had been in the said field nine or ten days, when they began to show an unhealthy appearance, and in the course of a few days the entire flock seemed blighted ; they began to die, and in a fortnight's time they were dying by scores. They were removed to another field as soon as they were observed to be ailing.—As regards prevention, keep the lambs in small lots only, and give them plenty of room.—An animal that has been generously fed, if attacked, is more likely to recover than one with poorer blood.—I have tried medicines generally used for diarrhoea, but without the slightest effect ; also other remedies under good veterinary advice, with the same result. The animal refuses all food ; but I have given nourishment in the form of gruel and such like—even port wine and brandy with water—but without any apparent effect, the system seeming powerless to take up nutriment of any kind.—I suppose that what would destroy these parasites in the lungs would destroy the life of the animal.—A fruitful cause is keeping too many sheep on a given quantity of land.—The animal, as soon as affected, declines to feed ; it wastes rapidly ; the blood becomes poor and thin, so as to be almost colourless ; if the lamb recovers it not unfrequently loses its wool.—All my experience points to the conclusion that the disease is not contagious ; that it is produced by some local cause ; that clover, or any other feed in the *second growth*, having been previously fed off with sheep, tends to produce the disease, or, at any rate, to accelerate it, so that it cannot be cured, but may be prevented ; and that the primary cause of the disease may be discovered.—When animals are affected, the most nutritious food should be given to them : oil-cake, pea or bean meal, coleseed (rape) in its early growth, or anything they can be tempted to eat ; for, unfortunately, when a lamb gets beyond feeding of its own accord it can seldom be saved. Old sheep, or even sheep a year old, I have never known affected, even though feeding with and subjected to the same symptoms as lambs that are.—I have spun my observations into greater length than I intended, but I beg to say, that if it should be in my power to give you any further information or assistance on this subject (which I look upon as one of the greatest importance to graziers of the present day), I shall most willingly do so.”

I especially direct the reader's notice to the following, which I have more recently received from the same gentleman :—

“ Supposing that your question relates to the period at which the disease is generated, I may observe that, upon one occasion, I divided a flock of lambs



when weaned and when 14 weeks old, removing a part from my farm at St Osyth to that at Erwarton, and put them with the latter flock. Some five or six weeks after, the lambs at Erwarton were seized with the parasitic disease in a most fatal form, *whilst those remaining at St Osyth remained perfectly healthy.*"

The same gentleman, in answer to my question, says, "the worms named by you were likewise found in the *stomach.*"

Mr BOGGIS, of Wix, Essex, who bought the lambs mentioned by Mr Bobby, p. 113, and who sent one of the dead lambs to my house for inspection, informs me—

"That out of the 200 lambs 80 died; that many were examined after death, and all had worms, although the disease was not prevalent in other parts of the district.—After six weeks the lambs became extremely weak, with cough and loss of appetite. They had always rock-salt by them, and turpentine was administered, but they were then too weak to bear the effects of it. The opinion of the owner and of many farmers in the neighbourhood was, that the worms were caused by feeding on red clover (a second growth), where *fat sheep had been feeding all the summer.* They had plenty of water both from a brook in the field and from the pump."

It must be remembered that the remaining 200 mentioned by Mr Bobby continued perfectly well. Also I learn that another farmer, residing a few miles from Mr —, lost about 50 the same year, and with the same symptoms, but none were examined after death."

Mr R. CRISP,<sup>1</sup> Leiston Abbey, Suffolk, who has lost several lambs from parasites in the lungs, replies:—

"I think that coarse grass fed early in the morning, when heavy dew is upon it, is very injurious. I once sent 90 of my lambs, apparently in perfect health, to a fair some miles distant. They travelled 7 miles the first day, and 12 the next, returning to stubbles that had not been fed with sheep, where they remained for three weeks. Some of them soon looked thin, and began to scour. On their return home some gradually sickened. They coughed, especially when moved; the diarrhoea continued, and they wasted much, and 60 out of the 90 died, although they were under the care of a veterinary surgeon.—I think that over-driving might have brought this on, but it is questionable. On other occasions I have lost a few from scouring. Some years my lambs have tapeworms in great quantities, and the lambs mentioned were many of them so affected.—I believe that parasites in the lungs, when they exist, are the consequence, and not the cause, of the disease."

Mr THOMAS CRISP,<sup>1</sup> of Butley Abbey, Suffolk, a large flockmaster, who has suffered greatly from Lamb disease during the last eight or nine years, shall furnish my last communication. I have been in frequent correspondence with him, have often visited his flock, and have examined many of his sheep and lambs after death. He says:—

"I believe that lambs have these parasites soon after birth, as I observed some to have that white bloodless eye, which indicates want of assimilation of their food. We lose but few cases comparatively before they are taken off the ewes in July and August, but after the dry cough and wasting have continued: with treatment, we generally lose half, and the other half never recover from the effects of the disease.—I believe all breeds equally liable, and have found the best lambs in the flock are as likely to be attacked as the worst.—We don't shear our lambs, but cold, exposure, dipping, want of nutritious diet, and driving them long distances, accelerate the complaint.—I cannot answer as to its infectious nature—Oil-cake and high feeding upon succulent and nutritious food when the lambs are attacked, I consider necessary.—I have had as many diseased where water could not be had as when they had free access to it; but when they are under treatment, or in an advanced stage of the disease, water is injurious. They often die whilst drinking.—I believe that lands heavily stocked with sheep are most likely to produce the complaint, and that artificial manures have

<sup>1</sup> The writer's brother.—ED.



nothing to do with the cause.—I have found the second crop of clover generally injurious when lambs are affected, more especially when it gets old and loses its nutritious properties.—I have had as much of the disease in wet as in dry seasons ; but it is certainly much more fatal here in dry, probably from the want of succulent and nutritious food.—The ewes should be kept all the year in good healthy condition, with a liberal allowance of dry food—hay, bran, or straw—with their turnips during winter, and the opportunity of licking rock-salt upon all parts of their run, and in their folds whenever they like it. Rape-seed or turnips should be provided for the lambs to feed on in July or August, or when taken from their mothers, and some cake or other such food given at the same time ; but especial care must be observed to keep the lambs off all artificial layers that have been previously stocked with sheep.”

In answer to other inquiries, at various times, this gentleman says :—

“ One of the worst and thinnest lambs I have alive is hog-jawed, so that it cannot feed upon short food or close to the ground.—The disease attacks our lambs about the third week in July, generally at the time the potato disease appears.—One year I lost 20 lambs out of 500 before the lambs were taken from the ewes, but the disease (parasitic) increased rapidly after the lambs were weaned.—One year directly after dipping, the lambs began to cough, and we thought it was occasioned by it. The weakly sheep sometimes die after shearing.—Old sheep are much affected with these parasites, but the effect upon them is less hurtful.—As regards treatment, my shepherd, whose intelligence is generally beyond that of his class, and who is a man of great observation, says, ‘Merrick’s’ and ‘Day’s’ mixtures are good for the scour, but not for the worms. Boiled green lupines were given, half a pint to each lamb, and about half of them recovered. Boiled walnut-leaves appeared to produce no effect. Spirits of turpentine and linseed-oil, a tablespoonful of each given every day for a week, partially beneficial ; but I think that a handful of salt given occasionally, with a dose of castor-oil, is the most successful treatment.”

It may be remarked, that if parasites prevail chiefly in the stomach, *large doses* of salt and turpentine are more likely to be beneficial than when the parasites are located in the air-tubes.

I take this opportunity of thanking all who have so kindly and willingly replied to my inquiries, for often more than one letter was required to elicit the necessary information. I have also letters from twelve gentlemen, most of them large flock-masters, who state that they have had no losses, and therefore can give me no information about the disease. Even these letters are not devoid of practical interest, for the greater number of the correspondents were living in dry and healthy localities. One correspondent, Mr Murray Blacker, Claremount, county Mayo, Ireland, says “the disease is unknown in his locality.”

Many answers I may yet receive, for the subject is far from being exhausted, and still requires much patient labour and research. I now leave the reader to sift and analyse the above evidence, the sum and substance of which will be found in the summary at the end of this treatise.

#### *Information from Foreign Countries respecting the Prevalence of the Disease.*

The gathering of foreigners at the late exhibition has afforded me an opportunity of obtaining extensive information upon this subject. I have spoken to most of the commissioners belonging to our colonies, and those connected with the various European states, and the following is a condensed account of the information I have obtained :—

In Australia (as I learn from Sir Redmond Barry, President of the Commission for Victoria ; Mr Dutton, Commissioner for South Australia ; Mr Hamilton, Commissioner for New South Wales ; Dr Milligan, for Tasmania, and others), “these parasites are not known. The chief diseases among sheep in Australia are foot-rot, scab, diseases of the spleen (milt), in some districts ; and in lambs a kind of catarrh, which sometimes carries off a vast number of them.” It is barely



possible, however, that these parasites may exist without having been discovered, but not, I suspect, in large numbers, as in this country.

In Trinidad and British Guiana, Sir W. Holmes, the commissioner, tells me that "the disease is unknown."

In Canada, Dr Hurlbert (one of the commissioners) informs me that the complaint is never heard of; and I have learned the same from many others who have seen much of sheep-farming there. In Nova Scotia, according to Mr Uniacke and the Rev. D. Honeyman, the commissioners, the same information applies.

In Bavaria, Wurtemberg, and Saxony, where the sheep are more in a state of nature than in most European countries, I learn that the disease is but rarely or never met with.

In Russia, Mr G. Patterson (a gentleman of great intelligence, one of the Russian Commissioners, and Member of the Scientific Committee, Ministry of Crown Domains, St Petersburg), informs me that the disease is well known in Polessye, or the boggy woodlands of the western provinces of Russia; and he, moreover, tells me that a disease in the human subject, supposed formerly to depend upon *laryngitis* (inflammation of the larynx), is occasioned by the presence of these parasites. I have been unable, however, to meet with an account of it in any of the foreign journals.

Dr Gilchrist, of Rothesay, who was long in India, and who has written a practical treatise on the treatment of the diseases of the elephant, camel, and horned cattle, printed by order of the Indian government, informs me by letter, "that he has not met with *Strongyli* in the lungs of the sheep or camel, but that he has frequently found them in the intestines of the elephant."

Professor HYRTL, of Vienna, whose beautiful preparations of the internal ear of various animals and of other parts, which excited so much interest and admiration among physiologists at the late Industrial Exhibition, tells me in answer to my letter, that "in many parts of Austria, the disease produced by these parasites is well known to sheepholders;" that "these worms occasion sometimes horrible ravages, and kill sheep by hundreds." He has seen "convolutions of these worms ejected from the lamb by coughing. The disease in Austria is called '*Wurmige Lungenseuche der Schafe*'—'the parasitic lung-pestilence of sheep.'"

Professor BERGELIN, of Stockholm, replies to my letter as follows:—

"The disease mentioned by you in the lungs of sheep and calves, occasioned by *Strongylus filaria*, is well known in Sweden, and is sometimes very common; whether it is so in Norway, I am unable to say. The cure of this disease with us is smoking with chlorine. The tapeworm in lambs and sheep is also very common; for this, kamala is an invaluable medicine. A German veterinarian, Mr Hartman, made his experiments upon many hundred lambs. One drachm of it was given to each lamb; purging came on after three hours, and the worms were expelled. The bladder-worm in the brain (*Cœnurus*) is thought by us a worse evil, and it is seldom or never cured."

Mr ZOEPPRITZ, Ravensburg, Wurtemberg, Germany, writes me as follows:—

"The disease is nearly unknown in our country. I know but of two instances, which I believe originated in damp and luxuriant pastures in the Lower Alps, about ten miles from hence; it ceased as soon as the sheep were removed to a dryer country; there was no remedy but the butcher. It is said, however, that inhalations of heated tar have done some good elsewhere. The lambs affected were put into a house, and shut up for the night, the house being first well smoked with tar vapour. Diseases of lambs occur less frequently with us than in England, on account of the greater care we take to protect them in bad weather and against rain, and by the almost general practice in early spring, and in rainy seasons, of giving them dry food with their pasture. I have known large flocks of upwards of 2000 head of sheep, in which not more than 1 in 150 was lost all the year round, and this extending over fifteen years. Of all lamb diseases, giddiness (gid) is the one we are most afraid of; this, in some localities, carries off a large proportion of lambs."



The following communication, which I received from the Baron Von Nathusius, Hundisburg, Magdeburg, Prussia, I think worthy of especial attention, as he is a celebrated agriculturist and an extensive sheep-owner :—

“Regarding the *filariæ* in the air-tubes of the lungs, we have, till now, not been successful in observing their way of development, but there is scarcely any doubt that a similar process is going on to that in fluke (*Distoma hepaticum*). The disease occasioned by *filariæ* in the air-tubes of lambs has in former years in my neighbourhood been very frequent and most pernicious ; but now we very seldom hear of it ; I myself have not observed the disease during the last twenty years. We generally now feed the lambs during the wet season in large sheds or boxes. On many farms they are born in January, when the vegetation in our climate is totally interrupted, and snow for some time generally covers all fields, and then sheep and lambs are fed in the sheds with hay and roots ; and if the lambs are born in May, we seldom take them out before the autumn. Generally it was the opinion of old shepherds that *filariæ* were prevalent only in *wet* seasons, and on pastures not sufficiently covered with grass, so that the sheep were obliged ‘to swallow dirt,’ as they used to call it. It was generally believed that there was no efficient remedy : some shepherds used to make the lambs inhale smoke of tar or such stuff, but without any apparent effect. A lamb with worms in the lungs was regarded as a dying one. The only help was by strong feeding with corn and cake to keep up the constitution, and sometimes the lambs recovered ; but generally it was very injurious, because only some of them grew well and made good sheep.”

3. *The Results of the Author's Dissections and Researches in Lamb Disease, including an Account of the Pulmonary and Gastric Entozoa, with Microscopic Illustrations.*

The subject of this chapter is one of the most practical and important in the essay, for it is only by careful and frequent examinations after death that any reliable evidence can be obtained upon which philosophical treatment can be based. The quack and the charlatan, who care to know nothing of the structure of the bodies they attempt to mend and cure, have one remedy for every disease ; the man well acquainted with the animal machinery, to borrow from an old physician, “has twenty diseases without a remedy ;” but his knowledge gained by hard work and experience tells him that in many diseases Nature is the best doctor, and that thwarting and interfering with her plans by officious and ill-timed treatment often leads to disastrous results both in man and in brutes. With this prelude I proceed to give an account of a few of the inspections I have made during the last eight years, of sheep and lambs that were affected, or supposed to have been affected, with *Strongyli* ; the presence of *Strongyli* in the lungs and stomach, however, in the first examinations not being suspected by the farmer. I shall, however, select only such examples as are of practical importance, as it would be useless to multiply cases, unless they lead to a beneficial result.

My attention was first directed to this subject, in consequence of the loss of a vast number of lambs in July and August 1855 and 1856, by some of my agricultural friends ; but little then was generally known in this country of these parasites, and as far as I can ascertain, the presence of the gastric worms, that play so important a part in this disease, were unnoticed until the communication already alluded to (p. 454) was made at the Zoological Society by Dr Crisp.

Professor Simonds, in his excellent Essay on the Rot in Sheep (1862, p. 93), says :—“Our own researches have recently brought to light another and a fruitful cause of the death of sheep of all ages, even under every variety of good feeding, management, and location, from the existence of an undescribed variety of worm of the class *filaria*, within the *abomasum* (the digestive stomach). These entozoa, to the extent of many hundreds, fix themselves to the inner surface of the stomach by inserting their head into the mucous membrane, where they are



enabled to keep their hold without much effort, despite the peristaltic action, by being furnished immediately behind their head with four barbs, whose points are directed backwards, after the manner of a fish-hook."

The worms described by Professor Simonds I have not seen in the stomach, although I have found two species of *Strongylus* (not *filariæ*) in the stomach and small intestine; but it is the former worm, *without hooks*, that I have found so numerous in the stomach, and which, I believe, often adds so much to the fatality of lamb disease. But let me first describe the worms that I have so frequently alluded to. It must be remembered that this treatise is written for the agriculturist and general reader, and that the introduction of very minute descriptions, such as muscular fibres, nervous ganglia, yolk-sacks, &c., would be out of place.

As stated in the epitome of the entozoa (p. 455), the *Strongyli*, the genus of thread-worms to which the four species of entozoa belong, have male and female organs in different individuals, and that the males are smaller and less numerous than the females. It will be seen that the tails of the males depicted are furnished with a kind of sheath, somewhat in the shape of a horse's foot, in which are seen generally ten finger-like processes, not unlike the digitations of a frog's foot.

The worm *Strongylus filaria*, which inhabits the windpipe and lungs of the sheep, ox, and others of the ruminants, is white and thread-like, the females varying in length from an inch and a half to three inches; I have sometimes found them four inches. The oviduct, from which the eggs are extruded, opens about a third of the length of the body from the head, and if the worm, when alive, is put under the microscope, the long oviducts and ovaries are often forced out of the body.

The white oviducts of this worm occupy a large space, extending nearly from head to tail; and in every female worm that I have examined (including a great number), the young in most of the eggs are mature, as shown by the frequent egress of one of the wriggling eel-like creatures from its envelope. The mouth is furnished with papillæ; the *œsophagus* (gullet) terminates in a dilated stomach, and the rest of the alimentary track is generally nearly hidden by the oviducts.

The males are darker, and not so long and large as the females, and they are much less abundant, for on some occasions I have had much trouble to select males from a large mass of these worms. As regards the disproportion of the sexes, too, it may turn out hereafter that the males are more numerous at certain seasons.

The eggs are seen in all stages of progress, and their amount, perfect and germinal, is almost countless. Those that escape from the oviduct have generally the young worm in them fully matured and ready for egress; others contain only dark granular matter, and in this the young parasites may be seen, first a mere speck, which gradually assumes form and shape.

The manner of production in the body, I believe, is as follows:—the female worm creeps from the tubular into the parenchymatous structure of the lung, deposits her eggs and dies, as is shown by her remains; inflammatory fibrinous exudation takes place, upon which the young worms feed; after a time they gradually increase and find their way into the bronchial tubes, where they remain feeding upon the mucous secretion a longer or shorter time, according to circumstances, the condition of the animal, its food, &c. There is one important matter that should be mentioned here: when the worms escape from the egg, they contain only granular particles, and the assimilative and generative organs are indistinct; but before they leave the cysts, these parts are fully developed, as best described by Dr Ranke before alluded to.

The worm from the *stomach* of sheep is probably the *Nematoideum ovis Rudolphi*, although Deising thinks it was meant for the *Strongylus filaria* of the bronchial tubes. Rudolphi describes the body as spirally twisted; but this is an error, the convoluted appearance being given by the convolutions of the ovaries and oviducts round the intestinal tube, best seen under the microscope by *reflected* light. This worm I have generally found in the digestive stomach



(*obomasum*), and sometimes in large quantities. It is more pointed, smaller, and the females, to the naked eye, appear to be twisted ; indeed some have the appearance of two worms spirally coiled. Many of the females have a kind of sheath near to the tail, with a sword-like process that might be mistaken for a male organ. Although I have examined many of these worms, my experiments and observations respecting their origin are not sufficiently matured for quotation.

(*To be continued.*)

## VIVISECTION IN FRANCE.

(*From the Times of August 11, 1863.*)

SIR,—I have the honour to tender to you the most cordial thanks of the Committee of the Royal Society for the Prevention of Cruelty to Animals for the publication at various times of your Paris correspondent's observations on the practice of vivisection, and particularly for his fearless *exposé* in your edition of last Saturday. In directing public attention to abuses of this character, it is obvious that you are rendering an incalculable service to the great cause of humanity. Your correspondent's letter, however, will not surprise your numberless readers more than it has astonished the members of this Society. We have long been informed of the varied barbarities perpetrated upon living animals in the name of science, and we are aware that in this country, equally as in France, vivisection is vindicated by physiologists, anatomists, and medical men ; but we have been grossly imposed on if " at the Veterinary College of Alfort a wretched horse is periodically given up to a group of students to experimentalize upon," and if " at Lyons the removal of the hoof, which causes frightful suffering, is practised upon the living horse by the pupils," to attain expertness.

It will be remembered that our treasurer, Mr Samuel Gurney, with other members of the committee of this Society, about two years ago had an interview with the Emperor of the French, and that, having directed His Majesty's attention to the abominations alluded to by your correspondent, they received an assurance that an inquiry should at once be made into the same. Without delay a commission, consisting of scientific gentlemen, was appointed at the Academy of Medicine, pending whose deliberations an *ad interim* order was issued by the French Government suppressing the operations complained of at the Veterinary Schools of Alfort and Lyons. Shortly afterwards a vacancy occurred at the Alfort College ; and the appointment to the principal professorship of M. Magne, a gentleman highly esteemed for his humane tendencies, and for a treatise in which he powerfully seconded this Society's appeal to the Emperor, was hailed by us as an omen of great promise, and even as an earnest of His Majesty's designs in reference to this question. But of much greater importance are the assurances which, from time to time, we have received in reply to our inquiries—assurances to the effect that notwithstanding the apparent lethargy of the commission alluded to, and their mysterious tardiness in issuing their report, there is, *pro tempore*, an entire cessation of vivisectional abuses at the Colleges. From Lyons we learn,—“ The Professor of our Veterinary Schools never undertakes an experiment upon an animal without previously severing the spinal marrow, and thus depriving the animal of all feeling.” Also, from Paris, it is officially declared, “ Par une ordonnance de police les vivisections sont interdites dans les domiciles particuliers.”

While earnestly trusting we have not been misled, I am bound to admit your correspondent's letter is so forcible, that its effect must be to stimulate this Society to renewed energy for the repression of tortures which have no parallel in history, which the most graphic pen can merely outline, and which are enacted by gentlemen and students. “ Vivisectors may laugh, but I confess I was unable to endure that heart-rending spectacle,” is the expression of Dr Latour and of every one who has visited those medical halls, “ whence a' the tones o' misery yell.”

But, Sir, while we descry the cruel practices of a neighbouring nation, is it not meet that we discover our own? We are quite satisfied that the substance of your correspondent's reproach will not apply to the directors of our metropolitan schools of medicine. Is it true that almost daily an English "Magendie is laying bare the roots of a poor dog's vertebral nerves?" Can we show that our medical students do not "steal dogs and entice cats into their lodgings, and repeat upon them the experiments they have witnessed the day before?" As this Society has trustworthy information on these matters, it would be culpable were I not to add two facts, highly honourable to the managers of the institution to which they refer—viz., that the Royal Veterinary College is free from the shadow of an imputation in reference to operations upon living animals for the instruction of students; and that some (I am afraid to say how few) of the hospitals and medical schools of the metropolis prohibit vivisectional experiments.

I have the honour to hand to you a copy of the Report of an international congress, called to consider this question last year, and to offer a similar copy to any lady or gentlemen who may feel anxious to co-operate with your correspondent and with us in mitigating the tortures of animals inflicted in respectable places.—I have the honour to be, Sir, your obedient servant,

THE SECRETARY.

Royal Society for the Prevention of Cruelty  
to Animals, 12 Pall Mall, Aug. 10.

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## VIVISECTION.

(From the Times of August 12, 1863.)

SIR,—I trust you will give one who has had twenty years' experience of medical students space to make the most emphatic protest against the insinuation contained in the letter of the Secretary of the Society for the Prevention of Cruelty to Animals, to the effect that medical students are specially chargeable with cruelty to animals,—cruelties alleged to be perpetrated under the cloak of physiological enthusiasm.

Nature does not reveal her mysterious workings to prentice hands. To obtain a result from a vivisectional experiment, great knowledge of physiology, extreme delicacy of hand, and unwearying patience are required. I am quite certain that that there is no lecturer in the United Kingdom who would exhibit or repeat any physiological experiment involving the vivisection of the lowest animal without due consideration. The character of the lecturers needs no defence from me. As for the medical students, I will undertake to say, that were it known to his fellow-students that any one were guilty of the cruel amusements suggested by your correspondent, he would be instantly chased from the school to which he might belong.—I am, Sir, your obedient servant,

T. W. NUNN, F.R.C.S.

Middlesex Hospital, Aug. 12.

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(From the Times of August 13, 1863.)

SIR,—Mr NUNN, of the Middlesex Hospital, complains that I insinuate that medical students are "specially" chargeable with cruelty to animals. Unfortunately, your printer transposed the first word of the sentence in my letter alluding to the "directors of our metropolitan schools of medicine." If Mr Nunn will place the pronoun "we" second in the passage, he will find another "insinuation" in place of an exculpatory declaration. This was intended.

Medical students are not, of course, more cruel when they enter their profession than other students; but is it not to be feared that the shiver they endure at the first shriek of a wretched animal, tortured to illustrate a lesson, gives place sooner or later to perfect indifference? Else, how could the surgeon operate upon inoffensive creatures, cutting off slices at a time as an artist chips off his marble?



“When, after a series of transversal sections of the encephalon, we have reached the medulla oblongata, just above the upper roots of the par vagum, we find that respiration continues almost normal. If we now cut away the part of the medulla giving origin to this pair of nerves, we find in most cases that respiration is suddenly stopped. . . . The stronger an animal is, the more parts of its encephalon can be taken away before we destroy respiration.”—*Lancet*, No. 600.

Is there a gentleman untrained to this slicing of living animals that could even witness it! The inference is striking.

That vivisections are practised in certain metropolitan medical schools I am now compelled to state openly. My proof is in the handwriting of the officials.

Magendie, whose horrible experiments your Paris correspondent alluded to, at the close of his career recommended his friends not to consult a vivisector, who, he alleged, obtained his knowledge from sources which would inevitably mislead. An English Magendie openly proclaims in the lecture-room, and through the press, that he is in the habit of repeating his cruel tortures. “I have made this experiment upon animals belonging to more than twenty species.” This is the “due consideration,” I presume, which Mr Nunn affirms “every lecturer in the kingdom entertains before exhibiting or repeating” such spectacles—this unblushing statement of one of the most eminent vivisectors in this country, whose printed researches, I do not hesitate to state, are startling enough to fire the most phlegmatic philosopher with indignation! The only specimen I have at hand is as follows:—

“It seems, indeed, wonderful to see animals, after the puncture of some part of the encephalon with the point of a needle, *turn round* (the italics are the author’s), just like a horse in a circus, or *roll over and over* for hours, and sometimes for days, with but short interruptions. . . . The trunk and neck of the animal are bent by a spasmodic action on the side of turning, if it has a circus movement; and it is bent like a corkscrew, as much as the bones will allow, in cases of rolling. . . . To add to the strangeness of the fact, in this last case the muscles remain contracted sometimes for hours, sometimes for days and weeks. As long as it lives (many days, or even many months), these phenomena may be observed. . . . In mammals the least puncture of the auditory nerve causes *rolling*; violent convulsions then occur in the eyes, the face, and many muscles of the neck and chest.”

Again, in reference to another experiment, he says, “The least pressure upon the skin makes the animal shriek.”

But perhaps, sir, I can supply the key to Mr Nunn’s “due consideration.” Sir Charles Bell has left it on record in reply to foreign writers who had improperly quoted him as an advocate of vivisection:—

“In a foreign review of my former papers, the results have been considered in favour of experiments (on living animals). They are, on the contrary, deductions from anatomy; and I have had recourse to experiments, not to form my opinions, but to impress them on others. It must be my apology that my utmost powers of persuasion were lost while I urged my statements on the ground of observation alone.”

Will Mr Nunn accept this as a reason why “lecturers should exhibit and repeat?” If so, he will narrow the issue. If not, let me add the words of Sir Charles:—

“Anatomy is already looked upon with prejudice; let not its professors unnecessarily incur the censures of the humane. Experiments (vivisections) have never been the means of discovery; and the survey of what has been attempted of late years will prove that the opening of living animals has done more to perpetuate error than to enforce the just views taken from anatomy and the natural motions.”—I have the honour to be, Sir, your most obedient servant,

THE SECRETARY.

Royal Society for the Prevention of Cruelty  
to Animals, 12 Pall Mall, Aug. 12.

(From the *Times* of August 11, 1863.)

SIR,—In your leader on the subject of vivisection, which so ably advocates the cause of humanity, you state that a commission has been appointed by the French Government to investigate the expediency of “vivisections,” or of the cutting up animals alive. The official report of this commission was read to the Imperial Academy of Sciences of France, at its sitting of the 4th of this month. The reporter, observing that the discussion of this question was commenced by English writers, justly reprehends the indulgence in prize fighting, dog fighting, &c., which disgraces the English people. He enumerates the benefits which have been afforded to science by experimenting on living animals. Some of these are unquestionably valuable, but they are chiefly those which in their performance have subjected the unfortunate animals to little pain. It is an opinion firmly held by many physiologists that experiments which, by the suffering they occasion, disturb the natural functions from their ordinary working, give results on which little reliance can be placed, for the very reason that they are not obtained in natural conditions.

The value of life in the lower animals is too small to justify the torture of worn-out horses and dogs, that the skill thus obtained may be subservient in treating those still serviceable to man. The human surgeon requires frequent practice on the human body to enable him to operate with safety and probability of success; the amount of benefit obtained by manual dexterity in dissecting the lower animals, in consequence of the difference of form, is small, and of secondary importance.

The first of the conclusions of the Report which follow is erroneous in my opinion, but their insertion is useful, as they contain the principles which guide the French Government in controlling vivisection in France :—

1. Vivisection is indispensable to the study of physiology, and of operative veterinary surgery.
2. It ought, nevertheless, to be employed sparingly, and all appearance of cruelty should be avoided.
3. The experimenter should always have the real progress of science in view.
4. Students should not be permitted to perform vivisection except in public, and in the presence of experienced professors.
5. All means for alleviating pain compatible with the object in view should be employed.

If these conclusions are acted upon, the practice will be confined within narrow limits, and its complete discontinuance must be due to the good feeling and sense of scientific men themselves.—I am, Sir, &c.

F. R. C. S.

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(From the *Sporting Gazette*, August 15, 1863.)

THE unwearying assiduity with which the conductors of the daily press cater for the amusement and instruction of their readers during the dreary political lull, and corresponding dearth of news, that follows upon the close of the Parliamentary session, is deserving of all praise. Many and ingenious are the devices resorted to, but the attentive student of the phenomena of journalism will recognise in them all the prevalence of one common feature. The process is generally somewhat as follows :—A possible case of grievance, or a promising social question is started by some obliging correspondent—whether real or imaginary it is little to the purpose: another equally opportune individual takes up the cudgels on the other side—reply provokes rejoinder—and as the feud broadens, half a score of amateur *littérateurs*, ambitious of the glory of print, rush to the rescue, until, like the genii from the smoke, the petty quarrel swells into a gigantic controversy, which, after doing duty for any number of columns, is finally yarmed up in the editorial crucibles, and the whole question solemnly dismissed in a ponderous “leader.” Hitherto, the questions for discussion have been felicitously



chosen—the first requisite being that they should be interesting to the general public. Thus the Hotel Extortion grievance—the Midnight Meeting movement—the great Matrimony on Three Hundred a Year problem—the Pretty Horse-breaker difficulty, and a few other leading social questions, have each in turn been successfully trotted out, and enjoyed a tolerably good run. But this year has exhibited a sad falling off—our “sensation” writers having been unable apparently to discover any better theme for discussion than the old threadbare question of Vivisection—a subject about which, we apprehend, most newspaper readers know little, and care less. The only advantage, so far as we can perceive, that has hitherto resulted from the discussion—if indeed it deserve the name—of this question is, that it has enabled a few individuals of the ultra-humanitarian school to get rid of a superfluity of virtuous indignation and false sentimentality, with the least possible expenditure of their reasoning powers. The secretary of the “Society for the Prevention of Cruelty to Animals,” temporarily abandoning, we presume to meaner minds, the general supervision of cock-fighting throughout the United Kingdom, and the delicate task of collecting backstairs evidence, has rushed wildly into print, eager to brand some of the leading scientific men of France and England—men, it should be remembered, who have devoted a lifetime of patient thought and arduous investigation in the cause of a profession that has for its object the prolongation of human life and the alleviation of human suffering—with the shameful stigma of wanton and systematic cruelty towards the brute creation. Let us not be misunderstood. We would not be supposed, even for a moment, to cast an imputation upon a Society the value of whose exertions, so long as they are confined to its legitimate province, we should be the first to recognise and appreciate; but we must protest against any interference that might be in the least degree prejudicial to the advancement of our scientific knowledge. Whatever may be the value of the practice of Vivisection, regarded from a scientific point of view, it certainly is not pursued either in France or in this country in the spirit of wanton or wilful cruelty. Even supposing that all the experiments ever made on the bodies of living animals since the practice of Vivisection was first cultivated, could not be proved to have been productive of any single result, we should not be justified in condemning their repetition, so long as there existed any reasonable prospect of adding by these means to our present limited stock of physiological knowledge. Man is “of more value than many sparrows;” and if we are justified in destroying animal life for purposes of food or sport, surely the diminution of human suffering may be legitimately purchasable by similar means, provided always every precaution be taken against the infliction of unnecessary pain.

The most plausible objection that has been hitherto raised against the practice of Vivisection is based on the score of its inutility, on the ground that the examination of a subject suffering under the knife can afford no reliable clue to the operations of a healthy and undisturbed organisation. In the official report of the Commission appointed by the French Government to investigate the expediency of Vivisection, read before the Imperial Academy of Sciences on the 4th of this month, the force of this argument is fully admitted, it being stated that the most valuable experiments on living animals are those in which the operations have been conducted, so as to occasion as little pain as possible to the subject. It should be remembered, moreover, that both in the English and French schools few experiments are ever made on the living animal, without previously severing the spinal marrow, or administering chloroform, and thus depriving the subject of all feeling.

The report of the Commission above referred to is especially valuable, inasmuch as it is a deliberate expression of opinion on the part of a body of scientific men specially appointed to investigate the whole question of Vivisection in its relation to the study of physiology and the practice of veterinary surgery. The following conclusions are the result of their labours:—

1. Vivisection is indispensable to the study of physiology, and of operative veterinary surgery.

2. It ought, nevertheless, to be employed sparingly, and all appearance of cruelty should be avoided.

3. The experiments should always have the real progress of science in view.

4. Students should not be permitted to perform vivisection except in public, and in the presence of experienced professors.

5. All means for alleviating pain compatible with the object in view should be employed.

As a parallel to these conclusions, we may quote the following passage from a distinguished English writer, in which the whole controversy is placed in its true light:—"It is not the infliction of pain or death for justifiable objects, but it is the taking a savage pleasure in the infliction of pain or death, which is reprehensible. The Iagos and Zelucos of the human race—the man-tigers who delight in cruelty—are just objects of abhorrence; but when animals are sacrificed on the altar of science that Nature may reveal her secrets, the means are consecrated by the end for which alone experiments are instituted by the votaries of knowledge and the friends of the human race. Here, then, we take our stand. We defend the sacrifice of animals, in so far as it is calculated to contribute to the improvement of science; and in those parts of physiological science immediately applicable to medical practice, we maintain that such a sacrifice is not only justifiable, but a sacred duty."

## INTERMITTENT PARALYSIS OF THE TWO FORE LIMBS IN A HORSE.

By Professor BOULEY, Alfort.

(From *Recueil de Médecine Vétérinaire*, August 1863.)

THE subject was a four-year-old bay gelding, well bred (Anglo-American), which had been purchased for the Emperor's stud. He was being exercised at a rapid trot in the Champs-Élysées, when he suddenly fell, as if struck by apoplexy. He was quite unable to rise for several minutes, but on recovering himself he got up and walked to his stable without the slightest inconvenience. The Emperor's veterinarian finding nothing amiss with the animal, set it down as an epileptic fit, but had the horse conveyed to the Veterinary School at Alfort. Here the animal was put under restraint, with the view of exploring *per ano*, to ascertain the condition of the posterior aorta; and in the course of four minutes, during a violent struggle, he suddenly fell to the earth, and notwithstanding he was at once unbound, he could not for several minutes regain his feet.

On recovering it was found that he could move with the greatest freedom and ease, being possessed indeed of fine action; but if trotted sharply for three or four minutes he suddenly lost control over his fore extremities, sought to support himself against the truss in the yard of the hospital, and quickly fell to the ground, with this peculiarity that the head always came down first. The fore limbs seemed first feeble, and then lost all power of supporting the body. This result invariably followed when the animal was subjected to the above-named cause, and it was always several minutes before the animal could get upon his legs, though he struggled ineffectually to do so. After having been several times subjected to the above-mentioned treatment, he remained down for some hours, but the same evening seemed as lively and well as ever. The circulation, and to some extent the respiration, were accelerated during the weakened condition of the limbs, but returned to the normal standard when that passed off.

*Diagnosis.*—The effects on the fore limbs being somewhat analogous to those observed in the hind, when these are insufficiently supplied with blood, in connection with obliteration of the posterior aorta, close to its pelvic extremity, it was supposed that a fibrinous clot might exist in the anterior aorta, and prevent the free supply of blood to the anterior parts of the body.



This condition of matters continued for five months, when the animal died of pneumonia, after eight days' illness. The autopsy was made next morning, and revealed the following facts :—

The abdominal viscera were quite healthy. The right lung was the seat of a red hepatisation, which had invaded almost its entire substance. The left was healthy except at its lower part, which was slightly infiltrated. The heart was sound. The arteries, veins, and nerves in the various regions of the body were examined with the greatest care, without disclosing any thing abnormal. The muscular system was firm and healthy ; it here and there showed yellow patches, as if from commencing fatty degeneration, but this condition was as common in the hind limbs as in the fore. The spinal cord seemed normal in every respect. The brain was carefully exposed by M. Goubaux, the able professor of anatomy, the cranium being opened by its base. The dura mater had a very dark hue, especially in the vicinity of the cavernous sinus ; and on opening it this cavity was found to be filled with a large black clot, extending into its various ramifications, and evidently formed since death. When this clot had been carefully cleared away by washing, there was still left a firm, resistant, and elastic fibrinous coagulum, of a yellowish white colour, and evidently of old standing. It was of the size of a small hazel nut, placed in the posterior part of the sinus surrounded almost entirely the trunk of the internal carotid, and was fixed at two points to the internal aspect of the cavity. It extended forward to the posterior aspect of the pituitary body. The transverse anastomosing branch between the internal carotids passed through the centre of the clot. The rest of the encephalon was carefully examined, but no other lesion was discovered.

M. Bouley considers that this coagulum interfered to some extent with the return of blood from the cranium ; but that in ordinary quiet circulation the amount of blood propelled into this cavity could still find a sufficient means of exit, and circulation accordingly continued. When, however, the heart's action was excited by exercise, and a greater amount of blood pumped into the cranial box, it could no longer escape with sufficient facility, and a stasis of blood in the brain substance was the consequence. The sudden loss of muscular power whenever the patient was excited, and its continued absence until the force of the circulation had been reduced, and time had been allowed for the re-establishing of an equilibrium, gives considerable colour to this suggestion. A curious question arises here ; Why did the fore limbs especially suffer, while the power over the hind remained almost unaltered ? M. Bouley here asks, Are we to follow Sancerotte and Serres in the opinion, that the posterior part of the cerebral lobes preside especially over the fore limbs ? Upon this nothing positive can at present be affirmed.

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## MALADIES WITH A MORBID FERMENT.

By Dr POGGIALE.

(*From Gazette Medicale.*)

No question of physiological chemistry is of more importance than that of fermentation. The method in which ferments act, the phenomena they give rise to, their power of inducing changes in other bodies by simple contact, the impossibility of explaining their action by any known law of chemistry, and their action upon organic matters, and especially on the blood, render the study of these agents in the highest degree interesting and attractive.

In the actual state of the science, the general definition of the word *fermentation* presents the greatest difficulty. In reality it is not yet well ascertained if a ferment is an organised matter, and what relation exists between the fermentation process and the production of organic bodies. By fermentation are explained the

spontaneous decompositions of vegetable and animal tissues ; as dry rot, eremacausis, gangrene, &c., and all the series of transformations by which organic matter is resolved into water, carbonic acid, ammonia, and mineral products. It is by fermentation that amygdalin produces the poisonous oil of bitter almonds and prussic acid, myronate of potass the essential oil of mustard, pectin changes to pectic acid, tannin to gallic acid, sugar to alcohol and carbonic acid, urea to carbonate of ammonia, &c.

If you know little of the nature of ferments, we know that they tend to resolve organised substances into simple compounds, that the essential condition of their existence as an organic matter to decompose, and that they perform important functions in the animal economy.

Cagniard-Latour, Turpin, and Pasteur Agne, in looking upon the ferment as an organic product propagating itself in contact with albuminous matters, Pasteur states that cryptogamic plants of the genus *mycodermata* possess the property of transforming alcoholic liquids into acetic acid, and that the atmosphere carries about ferments in the shape of ova of infusoria or spores of mucedæ.

These bodies find in the blood of the animal economy conditions very favourable to their development, and we can indeed, by injecting certain ferments into the circulation, produce maladies strongly analogous to others that occur spontaneously. Examples of these we have in pysemia, dissection wounds, septic diseases from injection of putrid pus ; and the various contagious maladies, as glanders, small-pox, &c., are of a similar nature. Polli designates these *catalytic maladies*, since all the symptoms depend on changes in the alterable principles of the blood from contact with a morbid matter (ferment).

M. Polli has conclusively demonstrated that it is quite possible to neutralize the morbid ferments in the blood by chemical agents, not incompatible with the health of that fluid, and by such means accordingly we must hope successfully to treat these maladies.

Sulphurous acid and the alkaline and earthy sulphites being capable of arresting the fermentation process, Polli has exerted himself to ascertain what doses may be safely and successfully employed in the living animal. The following are among his experiments :—

1st. A gramme of pus is injected into the femoral vein of a dog, and in the succeeding five days 10 grammes of sulphite of soda are administered. The animal is at first dull, and refuses food, but the following day is lively and eats freely. The experiment repeated on the same animal gives the same results.

2d. A stronger dog has one gramme of pus injected at twice into his veins. Next day he is dull, but takes his food ; but on the third he is prostrate, respiration is difficult, the wounds are sanious, the left leg swells, and he dies in ten days.

3d. An equal quantity of putrid blood is injected into the veins of three dogs : one died five hours after, a second after five days, while the third rapidly recovered under the administration of sulphite of soda, though at first he had been very ill.

4th. A number of other experiments, made with putrid blood and the nasal discharge of glanders, showed that the subjects died with all the symptoms of general infection if left alone, while they as constantly improved under the administration of the sulphite of potass.

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#### WEST OF SCOTLAND VETERINARY MEDICAL ASSOCIATION.

THE Quarterly Meeting of this Society was held in the Institution Rooms, Catherine Street, Glasgow, on Wednesday 5th August.

ALEXANDER ROBINSON, Esq., V.P., Greenock, in the Chair.

The Secretary read the minutes of former meeting, which were approved of ;



also a letter from Mr Dickie, V.S., Ayr, stating his desire to become a member, and for that purpose would endeavour to attend at next quarterly meeting.

Messrs John M'Dougall, V.S., Cardross, and J. Ferguson, V.S., Ayr, were, after ballot, admitted members.

The Chairman then called attention to the prosperous state of the Society, the roll now containing upwards of thirty veterinary surgeons, all situated at various places, and embracing a very large district of the west of Scotland. Nearly all the members of the profession in this district are members of this association; some, no doubt, were resident at a considerable distance from the place of meeting, so that their presence could not be expected regularly; but it gave him great pleasure to see so many of his brethren here to-day, and hoped they might find it convenient to attend often, in order that all might gain the more information, by the diversity of opinion and friendly discussion on the subjects brought forward. To-day we are specially called on to discuss the subject of Quittor; but before calling on Mr Mitchell to address you, I would take this opportunity of expressing a few words of testimony to the worth of two members, father and son, who were both present at our last meeting, but are now on their journey to the far South—New Zealand. I cannot but express my feeling of sympathy with you at the loss of two such zealous supporters of this Society as the Messrs Dunlop. I am certain I express your sentiments, when I say that we all loved them as brethren, and look back with pleasure on the many hours they spent with us in this place. With the exception of Mr Anderson, I believe the minutes will bear me out in saying, that no one was so regular in attendance as Mr Dunlop, sen., during his period of presidency of this Association; he always found time to attend to its duties, discharging them with faithfulness and fidelity, gaining thereby the esteem of those who only had such an opportunity of being brought into his company; and after retiring, he continued equally zealous for the welfare of all, especially the younger portion of the profession. Often did he say, that he looked forward to them as the grand workers out of those benefits to be derived from associations such as this. That such an idea was not superficial, but deeply grounded in him, may be learned from the fact, that he and our highly esteemed friend, Mr Anderson, may be said to have been the originators of this Society in Glasgow; and we can form some little idea of their pleasure, at seeing their designs so nobly wrought out, at present, and to all appearance, a great success. I could say much in behalf of our friend did time permit, and those present who were his companions at college could testify to his worth as a companion and friend. He was free and familiar; a friend of the young, an esteemed companion of the old of this Association. And now that he and his son are gone, I am sure they carry with them our best wishes for their own and their families' future welfare, hoping, as we do, that they may land safely, and enjoy many days' health and true happiness, and, to use the saying of our national poet, be blessed in basket and store.—Mr Anderson said he would be glad to endorse what had been so truly said of the Messrs Dunlop by the chairman. No one entertained a higher opinion of them than he did, having been a close companion of Mr Dunlop, sen., since their college days; and during all that period never expressed an angry sentiment toward each other,—always happy to meet and sorry to part. So if this Society felt a loss at the departure of both, he as an individual felt it more. The chairman had very ably referred to them both as eminent members of this Society, and especially to the elder, as being the means of its origin. I may state, that for many years both of us felt that such would be a benefit to the profession, and nearly twenty years ago had one organised, but never could get it properly worked out, owing in some measure to the diversity of opinion on the subject, and, perhaps, more especially to the want of members of the profession, near the place of meeting in Glasgow, its existence there was short. Again we made a movement, which was the means of this Society's origin; and now, from what I have witnessed at our meetings, the information regularly to be derived, and the spirit displayed by the members, I say it is almost like an impossibility to think of it being extinct for some time at least. We are all alive now

to its benefits ; and so long as we keep united and anxious for the benefit of the profession and our own, I cannot believe that those eminent young men who now rank as its chief supporters will allow such an institution to get weak or die. No doubt time changes the face of everything, and our association is not exempt, having been called to record the loss of two members, and called on to enroll other two. So our ranks are increasing and our influence extending ; for in the far south we will have an able correspondent, Mr Dunlop, junior, who was elected our assistant-secretary, and in all probability would have filled the position of chief secretary, as our esteemed friend, Mr Pottie, was desirous of retiring from that office. But, now that he has gone, we will be much benefited by his regular communications to us upon those diseases incident to that country. Much had been said of the father, but of the son he would say, that he was possessed of ability, having exhibited it while in college so recently by carrying off the first prize, and amongst us by his familiarity with those subjects discussed here. I am sure we all look forward to him as a young man who will rise to an elevated position in the profession, and, if spared, be an honour to this association. Several members spoke to the worth of those two gentlemen, and agreed to send an address as a mark of esteem.

The SECRETARY then proposed, that one half-hour, or, if necessary, one hour, be devoted to the recital of any rare case of disease that had occurred, during each meeting, and that such cases be fully discussed at subsequent meetings, should a majority of the members agree.

Mr DOBIE seconded the proposition, and would suggest, if time permitted, the motion should be put into execution to-day, as he had a case or two of perplexity, and understood that several other members would be glad to recite others. The motion was agreed to, also Mr Dobie's suggestion, when peculiar cases of great interest were related by Messrs Dobie, M'Dougall, the Chairman, Secretary, and Mr Sharp. As the discussion of each was not terminated, it was agreed to bring them forward at next meeting.

The Chairman then called upon Mr Mitchell to address the meeting on Quittor, which he did in a most satisfactory manner, entering minutely into the structure of the parts, the nature of the disease, the causes and treatment. An animated discussion followed upon the best methods of treating certain peculiar cases, and much diversity of opinion was expressed, all of a practical nature, and calculated to be of vast importance to all.

The Chairman then intimated, that the Society meet next month, and that Mr Blackie, V.S., Bellshill, will introduce a subject, and give a paper on it. Each member will be informed of the subject eight days before the meeting takes place.

ALEX. POTTIE, *Secretary*.



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### ORIGINAL COMMUNICATIONS AND CASES.

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*Dermo-Pilous Cyst from the Neck of a Bullock.* By JAMES LAW,  
Professor of Anatomy, New Veterinary College, Edinburgh.

AMONG the encysted adventitious products met with in the animal body, perhaps none are more curious or interesting than those composed of animal products of a healthy character, but which, from their position, must be considered as abnormal. One of these curious specimens has lately come under our notice in the shape of a pilous tumour enclosed in a dermic-cyst. The cyst was lodged in the neck of a bullock under the levator humeri, and was completely shut off from all communication with the external cutaneous envelope. The animal from which the cyst was taken was in excellent condition, and the muscular mass in which the tumour existed contained a considerable amount of adipose tissue.

The wall of the cyst resembled the delicate skin met with around the openings of the various mucous tracts. It agreed with skin in being composed of a fibrous or dermoid layer, having on its inner or free aspect a cellular or epidermoid structure. Its outer or attached surface was surrounded by a tolerably thick layer of what may be called the subcutaneous adipose tissue. Embedded in the skin, and projecting into the cyst, were numerous hairs pretty regularly distributed over the surface, and one corresponding to about every square line of its surface. I satisfied myself that these hairs were not only fixed in the walls of the cyst, but really grew from this envelop in which their bulbs were firmly implanted.

The contents of the cyst were composed in great part of hair similar to that growing from the wall, but chiefly of a dirty light-yellow granular substance, having a strong repulsive odour, and bearing the appearance of sebaceous matter. On being placed under the microscope the latter is seen to be chiefly composed of withered and flattened epidermoid cells, some of which are nucleated, of a granular matter, probably sebaceous, and of a few oil globules, which may however have come from the subcutaneous fat.

The hairs, which are pretty uniformly distributed throughout the mass, are of a dark-brown colour, and are mostly about an inch in length. They have the general appearance of ox's hair. Some are light-coloured, delicate, and apparently diseased; but the majority are well developed, and quite healthy.

The mass is of a pasty consistence, and is in the form of a flattened disc, measuring three inches in diameter, and an inch and four lines in thickness at the central portion.

*Remarks.*—The contents of cysts are in a certain number of cases made up in part of hair, and less frequently also of teeth, bones, and even other structures not forming normal components of those regions in which they are found. These are most frequently found in the ovaries; and, speaking of their existence in these organs, Dr Jones denies the opinion that they constitute the remains of a partially absorbed foetus, considering them, on the other hand, as erratic productions of the Graafian vesicles, acting under the influence of some unnatural stimulus. There is some plausibility in this conclusion when they are met with in these germ-bearing cavities of the ovary; but we cannot thus account for those specimens which have been met in parts of the body remote from these organs.

Such tumours have been met with in almost all parts of the body, of which the following may be mentioned:—ovaries, uterus, abdomen (Fattow, Rieter, Pacini, Philips, and Young); in the anterior mediastinum (Gordon); scrotum and testes (Rozenberger, Hartmann, Vendt, Velpeau); stomach, intestines (Highmore); orbit (Barnes); at the tentorium (Hawkins); at the palate (Otto, Sandifort, Ehrman, Stadenski); neck.

When these structures are met with occupying an ovarian cyst, they are perhaps best accounted for by the normal reproductive function of the organ as suggested by Dr Jones. Indeed, in no other way can we account for the presence of 300 teeth in an ovarian cyst of a sterile female, as reported by Ploucquet and Antenrieth. When, however, such structures are met with in other parts of the body, there is, to use the words of Dr Ogle in reference to Mr Hawkin's case of Pilo-epidermoid Cyst in the Dura mater, "no formative or developmental power, as in the Graafian vesicles, to explain such erratic productions." Dr Ogle explains this case very plausibly, by supposing that, before the closing of the fontanelles, some inflammation of the part had led to adhesions between the skin and dura mater, which became afterwards confirmed by the pressure of the sub-arachnoid fluid, and that a portion of skin was thus drawn inward and finally enclosed in the cranium. Even this will not account for such a case as that of Dr Gordon, in which there was found in the anterior mediastinum of a woman twenty-one years old a tumour containing portions of skin, fat, serous fluid, sebaceous matter, and what appeared the bones of an upper jaw, with seven well-formed teeth imbedded in them.

On the whole, then, it seems rational to conclude with Professor



Vrolik, that while many cases of this kind owe their existence to other causes, a certain number depend on the enclosure of a foetus, or some portion of one, within the body of its brother or sister—*foetus in foetu*.

The teeth-bearing cysts, when in the region of the maxillary bones, are probably dentinal cavities produced in the ordinary way, but in which the teeth, from improper direction or otherwise, have never cut the gums, but have become developed amongst the surrounding tissues.

The production of those cysts which contain hair with epidermoid cells and sebaceous matter only may be often easily accounted for. Sir Astley Cooper found that some of these could be emptied through a small natural opening communicating with the outer skin, and at once inferred that they were only examples of hair follicles distended with their secretions and overgrown. In the opinion of Paget, however, this holds true as regards the minority only of such cysts; and I feel confident that in the case recorded at the commencement of this paper no such means of communication with the external skin existed. The opinion of John Hunter and Sir Everard Home on the formation of this variety of encysted growths bears at the least a tolerable plausibility. The latter remarks—"Mr Hunter considers the internal surface of the cyst to be so circumstanced respecting the body, as to lose the stimulus of being an internal part, and receive the same impression from its contents, either from their nature or the length of application, as the surface of the skin does from its external situation. It therefore takes on actions suited to such stimuli, undergoes a change in its structure, and acquires a disposition similar to the cutis, and is consequently possessed of the power of producing cuticle and hair. What the mode of action is by which this change is brought about is not easily determined; but from the indolence of these complaints, it probably requires a considerable length of time to produce it. That the lining of the cyst really does possess powers similar to cutis is proved by the following circumstances: that it has a power of forming a succession of cuticles like the common skin; and what is thrown off in this way is found in the cavity of the cyst. It has a similar power respecting hair, and sometimes the cavity is filled with it, so great a quantity has been shed by the internal surface. Besides these circumstances, the hair found in the cyst corresponds in appearance with that which grows on the body of the animal; and when encysted tumours of this kind form in sheep they contain wool. What is still more curious, when such cysts are laid open, the internal surface undergoes no change from exposure, the cut edges cicatrize, and the bottom of the bag remains ever after an external surface. Different specimens illustrative of the above-mentioned circumstances are preserved in Mr Hunter's collection of diseases."

In the extirpation of these tumours, it is strongly recommended to use the knife in preference to escharotics, as by this means the

walls of the cyst can be more completely and satisfactorily removed, and the chances of recurrence reduced.

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*Chloroform in Parturition of Domesticated Animals.* By ISAAC SEAMAN, M.R.C.V.S., Veterinary Infirmary, Priory House, Saffron Walden.

It is reasonable to suppose that every veterinary surgeon of but few years' experience will recollect that cases of difficult parturition have come under his notice in which every measure adopted has failed to bring about a successful termination.

Spasm of the neck of the womb at the time of parturition is amongst the cases most perplexing to the veterinary practitioner; the foetus has arrived at the full period of gestation, but the dam fails to expel it from the uterus, and by ordinary means the veterinary accoucheur also fails. Time is allowed—six, twelve, or even forty-eight hours—and the womb remains in an obstinately spasmodic state; under such circumstances the life of many a valuable animal,—mare, cow, and sheep has been sacrificed. We have to thank Dr Simpson for the discovery of an agent which possesses the extraordinary property of subduing the nervous system in its most excited state—for by means of chloroform a foal, calf, or lamb may be extracted from the womb when all other means, medicinal or mechanical, will fail.

*Case First.*—A Durham cow had been in labour with the fourth calf forty-eight hours—and attended by a farrier. There was a long, spasmodic, spiral-like twist of the neck of the womb, the pressure of which would have paralyzed the strongest arm, and which resisted the most powerful doses of laudanum. The cow was made to inhale chloroform until she was entirely insensible,—that is, until the finger could be placed upon the naked eyeball without the lids closing, and in fifteen minutes the calf was removed. During five years many cases of a similar kind have come under my notice in which chloroform has acted admirably.

The last case, an Alderney cow, on the 8th inst., had been in labour twenty-four hours with the sixth calf. The state of the womb was similar to that of the first case. A shepherd was present, and I wished him to examine the cow and tell me if he ever found the ewe at the time of lambing in the same state; he said he had frequently, and that nineteen out of twenty had to be killed. This patient inhaled two ounces of chloroform, was made insensible, and the calf was removed in twenty minutes.



*Observations on the late Sir Tatton Sykes' Stud.*

THE interest excited by the sale and dispersion of Sir Tatton Sykes' justly celebrated stud of thoroughbred horses far surpasses anything of the kind on record; as, in fact, the collection of pure bred brood mares and young stock was the largest in existence of which we have any knowledge.

Nor was the intrinsic merit of the horses, highly as they were esteemed both at home and abroad, the sole or even the greatest cause of attraction which brought amateurs and buyers from every corner of the kingdom, from many other nations, and even from the antipodes. The name and character of the late Baronet had the greater influence in attracting visitors, and no doubt enhanced the price of the stud so much beyond what it was estimated to be worth.

We might have abstained from entering on a description of the Sledmere stud and its recent sale,—since almost every leading journal in the country has devoted some space to the subject,—but for the desire to pay some small tribute of respect to the memory of a great man and his works; whilst, from our intimate knowledge of both, the exposition of our views on some incidental points may not be unacceptable to our readers.

Now, when the name of Sir Tatton Sykes has become engraven on the memories of all Yorkshiremen, and of men in all parts of the kingdom, and when the sale of the 313 lots of horses, with the L.25,379, 11s. as the price realized, have become matter of history, it may be well to inquire what instruction does the work just completed afford us as worthy of being transmitted to future generations. In treating specially of the stud, we do not pretend to take account of more than a part of the many good works which will cause the memory of Sir Tatton Sykes to be handed down to future ages as a benefactor. His claims as a practical agriculturist, as a landlord and flockmaster, we must leave others to do justice to, though all are worthy of praise. We never visited the Sledmere stud that we did not make it a study, and can furthermore say that we never spent a day there without seeing something to instruct and much to interest us. And on the recent occasion—alas, the last opportunity left us!—the critical observation of each lot afforded the means to arrive at conclusions only to be drawn by comparison on a large scale where incidents are repeatedly presenting themselves.

Various are the views of men, as we have heard them expressed, as to the merits of the Sledmere horses; some denoting regret that such an unexampled stud should have been broken up; whilst others exclaim, What corn, grass, and other food, this number of horses must have consumed!

In making our critical remarks on the late Sir Tatton's system of horse-breeding, we find much to admire, with much that is suggestive

for future consideration ; and yet, when reducing the whole to its proper economical standard, we conclude that the directions left, that the whole stud should be sold, affords the best proof of the wisdom of the testator. The history of that stud, and the patriarchal age to which the late Baronet lived, indicated the crisis which his death was to bring about as that in which a thorough change should be made—which it had been inexpedient, because not in accordance with the feelings of the great man, to inaugurate in the latter years of his life. Though the present Baronet intended to keep up a stud, as we hear he does, and if it had been optional for him to keep or dispose of the whole, we unhesitatingly say that the course which has been adopted was the best to be followed. Every one knows how stock accumulates with time, and that even over a period far short of that in which the late Sir Tatton lived much will become cumbersome, which can with difficulty be cast off without a general clearing sale.

The history of the Sledmere stud would undoubtedly prove instructive and most interesting, were all the materials at hand for compiling it. The late Sir Tatton so outlived almost every one of the men who were his associates in early life, that contemporary reports, as they refer to years long past, must be accepted with some reserve, though no doubt, since he was little addicted to change, and never withdrew from those who merited his esteem, much unwritten but reliable anecdote is available. We know from Sir Tatton's own mouth, that the stud, if not first established by, received most important additions, when Sir Mark Sykes, about the end of last century, bought Hornpipe, by Herod, out of sister to Eclipse, for 1100 guineas ; though it is more than probable that Sir Christopher Sykes, the father of the two last Baronets, had already set on foot an improved system of horse as well as of sheep breeding on his estates over the Yorkshire wolds, which he had brought from a state of barrenness "to be one of the finest corn-growing districts in England."

The late Sir Tatton sometimes related incidents, which had happened long before, with a clearness of memory and fulness of detail beyond any other man we ever knew. An instance may be referred to, as it bears on the history of the Sledmere stud. This was in the summer of 1857, when Sir Tatton related to us the incident of the purchase by Sir Mark Sykes of Hornpipe, by Trumpato, out of Luna, by Herod, sister to Eclipse, &c.

In 1802–3 Hornpipe produced fillies by Sir Peter Teazle, and the last produce of the two was presented by Sir Mark Sykes to his brother, the late Sir Tatton. These sister fillies produced in the same year (1810), Prime Minister and President, both of which became renowned stallions, as the stud-book shows. Some of the Prime Minister mares were the dams of very good race-horses. The dams of Physician, Charles the Twelfth and Belinder, were Prime Minister mares ; and from the latter descends the last Derby winner,



Macaroni ; and President was probably the most widely reputed sire for getting hunters ever known in Yorkshire. Forty years ago, we remember when the late Messrs Dyson of London travelled their strings of excellent horses from Yorkshire southwards, that amongst the most highly prized were the President horses ; and even down to the present time one is constantly meeting with half-bred stallions and mares amongst the hunting classes in Yorkshire which claim near relationship with old President. The two Sir Peter mares, by means of the two stallions they produced, and one mare, sister to Prime Minister, effected much good in the Sledmere stud at an early date of its existence, affording more proof of what we frequently urge, on the influence of even a single mare under good management. The Teazle-Hornpipe mares combined in their breed the best blood of the pure English horse of that epoch,—viz., of Matchem, Marske, and Herod. Fresh blood was at frequent intervals introduced into the stud by Sir Tatton, and in turn the best horses in the country were sought after.

The late Sir Tatton aimed to follow nature in all that he produced, and adopted Bakewell's theory in breeding horses, as he did with his sheep. In carrying that theory out in practice, admitting its soundness, there is great liability to err, especially in the choice of stallions for particular mares ; these, as Sir Tatton knew well, may be large and powerful without being high ; as an example, if we were asked to name a stallion most likely to produce a Derby winner from Borealis, we should certainly not look for one limited to her own height, but should probably decide on Stockwell as our selection. In excluding some of the large and coarser type of horses, we believe that Sir Tatton's as a racing stud was under disadvantages. Horses as well as men form new families, with inherent peculiarities. Of such instances numerous examples might be cited. Sir Tatton, however, did not like a large stallion, and though a first-class rider, sought speed with power in a handsome horse, and never could be induced to like a plain one ; hence his stud was founded in character after his own taste. We never saw a large coarse horse or mare amongst the selections at Sledmere, and never saw one of the latter there with a plain head, but, on the contrary, all were as fine and pretty as the purest Arabs of the Desert. As the Sledmere stud was differently managed to any other in the kingdom, it may be well to consider the results relatively with that and others kept on smaller scales. To acquire an insight into the management, the liberal spirit and good taste which characterised the whole aim, and ruled in the selection of mares and stallions, it is necessary to go back many years in the inquiry, to be able to understand the early state and subsequent development which the establishment has received, when we shall find how much it differed on the whole from anything we are accustomed to see in those of recent times, which almost exclusively aim to produce stock for the turf.

The first aim of the Sledmere Baronets was to produce high-class

hunters, and to improve the breed around them of that class of horse. As is well known, love for the animal and his cultivation formed the great feature in Sir Tatton's character; and the earnestness and application with which he pursued this object have never been excelled, and seldom equalled. As the numbers of mares multiplied, and the peculiar notions which Sir Tatton entertained, of keeping them to very mature age before they were put in the stud, and by his carrying out the same practice with the geldings which were to be converted into hunters and riding horses, the effect was that of swelling the number of animals on the estate without tending commensurately to profitable result; whilst the cost of keep became proportionally high, and the stud so spread out, that, beyond the sound land and good pasture in season, there was not, and could not be the same care, handling, feeding, &c., which are found to form such essential steps in the development of the colt to form a race-horse. The Sledmere stud was distinguished from the first as being an amateur establishment, as it always continued to be, all modifications notwithstanding; the system pursued may be regarded as an improvement on those of continental nations, and as one that can only be imitated where land abounds and hands are scarce; and even then the practice of keeping mares fruitless until six or more years of age, and horses destined to work, almost as long before they are brought into use, is nowhere advisable. We regard it as not merely costly, but contrary to what experience and rational views teach us—as calculated to make the most of horses.

It has been commonly remarked that the Sledmere stud has furnished a small proportion of good race-horses relative to its magnitude and purity of blood; and since we believe the notions prevailing to be founded in truth, we do not hesitate to inquire into the cause.

Some, whom we have heard discuss the question, say that the mares, though sound and of good stamina, lack quality; that they were thick in the shoulder, and better adapted to produce hunters than race-horses. From such notions we entirely differ, and regarded most of the animals as wide and well-proportioned, such as we shall always find to prevail where the mares have freedom, and are amply fed on good land, such as the Sledmere stud had. The stock will soon become narrow, and look lengthy and fine when brought into use for racing purposes. The reason why the proportion of great winners produced from Sledmere was relatively small, may, we believe, be easily accounted for, while the excellency of the stock is admitted.

The breeding of race-horses constitutes an art, and differs in some essential points from that required for producing horses for other purposes; and it has become more and more so in modern times compared to former periods, when horses were not raced until they reached the age of four or five years; now it is said, that unless they can run at two and three, they do not pay for training. Here we



see cause why the Sledmere stud did not furnish winners in number equal to many others, and it is not necessary to determine whether the custom of running for most of the great stakes takes place at too early an age is at fault, or whether the system pursued in the late Sir Tatton's stud was too much of a waiting kind to enable his colts to meet the Bay Middletons, West Australians, Blinkbonnies, &c., which had from the time they were foaled received all the advantages which nature and art combined could confer. That which appeared the more natural course to Sir Tatton, however well it may have succeeded with horses to be brought out late to work, could not bear the test of early competition. We find that his method was at the opposite extreme to those now commonly adopted; and, whilst the practice has been gaining ground of breeding blood stock too artificially, by which means it obtains bulk and height at the expense of form and power, the stock having too little liberty for exercise, and insufficient time given for growing into form and for consolidation of texture; the not supplying them with all the benefits which regulated allowance of concentrated dry food imparts, with warmth, shelter, &c. in due order, were disadvantages which no after hurried means taken could repair.

Although the late Sir Tatton did occasionally send some mares to different stallions, the whole number, with such exceptions, were put to his own two or three horses; hence the stock was found to be more successful in some seasons than others, depending much on the horses used. Reference has been made to some of the very best stallions used at the Sledmere stud at early times. Comus was one of the horses Sir Tatton used most with the best success. That famous horse produced good hunters, left a number of good mares; and it was from the same stock that the stud achieved a great reputation on the turf, when Grey Momus, in 1838, was one of the best horses of that period, and was a very fine animal. The late Lord George Bentinck, who became possessed of Grey Momus, prized him so much, that when that nobleman, about the same time, bought Bay Middleton, as a stallion, he invited Sir Tatton to send "the whole family of the Momuses" to that great race-horse at Doncaster, where the horse was located. Accordingly Sir Tatton sent the Cervantes mare, Grey Momus's dam, and some of the Comus mares.

We do not recognise any time when the Sledmere colts were so good in equal numbers, at the age of two and three years, as those of Wormsley's produce. The Birdcatcher and Touchstone blood seems to have suited the Sledmere mares, as was shown by the Wormsley stock—and separately by that of Daniel O'Rourke and Rifleman more recently; while those two fine sons of Pantaloon, Sleight-of-Hand and The Libel, have done good service in the stud, especially in producing a lot of capital mares.

There was a defect in the management of Sir Tatton's stud, which was in some measure due to excess in the number of animals kept, and which, in taking this critical sketch, must be noted. It was

the keeping of many horses during the winter in farmyards, where they were constantly standing and moving in wet up to their fetlocks. To this the whole stock in the stud were not equally exposed; it was the geldings, which were kept on for making hunters, that were most of all kept in that uncongenial state. Whilst dilating on this, which is a common error, not only in stud managing, but in that of managing horses generally, we may say that Sir Tatton was conforming to the theory which prevailed—viz., that wet was good for horses' feet; and since no man we ever knew, equally informed with the late Baronet on things he undertook, was so open to receive suggestions, it may be necessary to explain why we have deferred until now to mention the above defect in the management. In the first place, we had formerly either been at Sledmere in the summer, when all the horses were in the best possible state, on the finest of well-cultivated, dry pasture-land, or else in the winter in frosty weather; so that it was only in latter years that the mistake occurred to us. Moreover, the evil effects of keeping horses' feet wet were occupying our attention; and so much did what was met with at Sledmere lead to confirmed conviction, by seeing the horses in the wet yards, that it proved one of the means which enabled us to reduce to a demonstrable system that which, before, experience had only enabled us to understand as isolated phenomena; yet, with all the good will, we could not advise at the time; that great crisis was approaching when only such changes as suggestions would have called for could be adopted, and therefore we refrained from reference to the subject, even for the purpose of illustrating our views. The summer condition of the horses formed so great a contrast to that just referred to, that much of what the feet suffered at one period was recovered in the other; but such did not come up to steady and perfect development of structures: it was at best like feeding a young animal well one six months, and not continuing to do so the other.

We have no doubt that it was possible, at the recent disposal of the stock, to have selected twenty-five mares out of the number (admitting the general high character of all of them), and that, with such reduced number, kept on parts of the same estate, differently managed, and put to a sufficient variety of good stallions, more good horses could have been produced, and more money realized by the sale of colts and fillies, than resulted from all that were annually sold in past time. We believe that the breed of the Sledmere horses is excellent; the mares come down from the best types of blood, and being well selected, sound in constitution and limb, every degree of perfection in their produce may be expected. There are, moreover, plenty of stallions which will cross well with these mares—the Touchstone, Birdcatcher, Melbourne, Sweetmeat, and Voltigeur blood we should select from, with that of several other families in constant formation, in succession.



## REPRINT OF REMARKABLE MEMOIRS.

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*The Breeding of Hunters and Roadsters.* By JOSEPH GAMGEE, Sen.,  
Professor in the New Veterinary College, Edinburgh.

(From the Journal of the Royal Agricultural Society.)

## PRIZE ESSAY.

THE subject to be treated of in this Essay is one which will undoubtedly repay the agriculturist for any amount of attention and skill which he may devote to it.

In aiming to produce a horse of that stamp which will realise the highest price for hunting purposes, the breeder is on the safest way to exclude the chances of failure; because the animal which just misses the character of the first-class hunter is of a quality which is available for the greatest variety of purposes, either for saddle or harness, or for recruiting the military depôts of the nation with the horses best suited for the service.

The subject requires to be considered in its economical as well as in its scientific and practical aspects. No amount of foresight will enable the breeder of hunters to obtain his highest aim with more than a fair proportion of his produce. In order, therefore, that a profit may be realised, the average horse must pay its expenses; those of a superior quality will then leave a good surplus gain, of which part will be required to cover deficiencies arising in a few inferior lots. This law of compensation applies to the breeding of horses of all classes; but its range becomes more extended as the stock rises in the scale of value; so that in breeding for the Turf, where the real prizes, when secured, run very high, the failures—weeds, as they are called—are most numerous and most unremunerative. Therefore, the more generally useful the class of horse is which the breeder aims to produce, the less will be his risk, and the greater the probability of profit if proper means are employed. When breeding is conducted on this principle, the type or model specially sought after is that of the noble weight-carrying hunter.

To define what is understood by the term *hunter*, it is necessary to go somewhat at large into the character of English horses, the different breeds or classes into which they are divided, and also into the history and progress of the race. The hunter has at no time constituted a distinct breed; in that respect he differs essentially from the pure blood-horse, whose genealogy has alone obtained a reliable record. The long-established renown of the English and Irish hunter has depended, and must depend, on the judicious crossing of breeds, with equally judicious management in their rearing, as well as on the judicious development of the breeds thus blended together. That some thoroughbred horses make clever, nay, the

best, of hunters, does not alter the proposition just laid down, because they form exceptional specimens.

The hunter is required to possess power, speed, and endurance in combination, to fit him for the stiff country he may have to cross, and for the high weight he will have to carry; but few thoroughbred horses can be found capable of fulfilling these requirements, and still fewer of these are generally available for the purpose, since the turf and the stud monopolise such choice specimens. If there be some gentlemen who, having no predilection for the turf or for breeding, prize good hunters so highly that they secure a few thoroughbred colts of the highest stamp for this object, still this source of supply is limited, uncertain, very costly, and prejudicial to the public interests.

If the whole number of blood-stock bred in England, in any given year, were looked over, when yearlings, by good judges, less than ten per cent. of them would probably be pronounced likely to make hunters able to carry fourteen stone; and if it were possible that a few of the most powerful of these could be secured for the purpose and converted into geldings, as in most cases would be necessary, our supply of hunters would be but little extended, whilst the process would sap the very foundation of our breeding establishments.

If only ten of the best-looking stout yearlings were annually picked out, amongst them would be comprised those of the "Stockwell" and "Voltigeur" class, and thus the standard of the horses to which breeders must turn for purity and stoutness would at once be lowered. All such exceptionally good horses as are here contemplated, whether bred or bought, would cost the owner probably L.1000 a-piece before they reached the age, or had passed through the changes and ordeals necessary to make the hunter. Although the training-stable may readily mount the light-weights, or even furnish brilliant chargers for the army, it is only by forethought and good management applied to cross-breeding that men of heavy weight can be adequately supplied with hunters. Size, substance, and power, with sufficient speed, may thus be secured, whilst in symmetry nothing, perhaps, may be wanting.

The history of the English hunter goes farther back than that of fox-hunting. The various accounts given of the Roman conquest of Britain inform us, that even then England furnished good horses, and that some 1500 years before we have any authentic record of the importation of Eastern blood for the improvement of the native breed. We have had, then, an old English race of horses, the history of which is lost in the distance of time; and from that stock, no doubt, the stamina and peculiar character of the English hunter of all times has been in a great measure derived. Moreover, if we take into account the fact that the natives of Britain have always been skilled in and pre-eminently fond of the chase, we may reasonably infer that they cherished and prized horses



suited for that purpose when hunting was a national service no less than a sport and pastime.

It may be true that men in our own time take to themselves too exclusively the credit of attention to improvements in horse-breeding. The answers which History, when impartially studied, gives to our inquiries, often tell two ways, and with a benefit received, exhibits an attendant drawback. When the land is placed under cultivation, and the animals that feed on it are brought under the control of man, their condition is improved or made worse, according as the artificial system has been well carried out,—that is, with the consciousness that every infringement on Nature's laws by man calls for compensating art and labour to devise and supply means which may counteract the evils arising therefrom,—or the reverse has been the case.

When people, taking a contracted view, contrast the English horse of the present day with the poor, rough, uncared-for creature they imagine he must have been in ancient times, they support their argument by reference to the little animals still found in some parts of the kingdom, the New Foresters, the ponies of Wales, and of the Shetland Isles. But in this they totally overlook the influence which a great change in their destiny has exerted. Unlike the larger and nobler horse, when he was free, the modern forester and mountain pony has been driven from the fertile plain, and doomed to live on sandy and boggy wastes, or to share with the goat, the deer, and little sheep the scanty vegetation of the mountain. Though such has been their lot for centuries, yet how perfect the form of many of them! how sound their constitutions and limbs! and how wonderfully their size has become adapted to their subsistence on scanty provender, whilst exposed to all kinds of weather!

The climate, soil, and topography of Britain were, it is reasonable to believe, as peculiarly congenial to the horse in early as they are known to be in modern times; hence the superiority of English horses over those of most other countries. With extensive tracts of natural pasturage, large forests, mountain and dale alternating, the horses of olden time found abundance of food, with shelter and shade to afford protection in all seasons. Horses so situated, we know, migrate in numbers together from mountain to valley, and *vice versa*, as the seasons change, and as the requirements of food and variations of temperature prompt their instincts.

The old stock of English horses must have received periodical additions, at various epochs, in ancient times, from Continental nations. We are especially informed that some four thousand cavalry constituted part of the army with which Julius Cæsar invaded Britain; and the Norman and other invaders, besides the Romans, naturally brought their horses with them. Under the influences of a soil and climate congenial to his nature, it may be inferred that the imported horse improved by the change, and

that fresh importations of stock wrought progressive changes in the whole race, and from these combined influences the characteristic stoutness and other special qualities of the English horse were established,

We have, however, to search far down the history of time before we find any distinct record of the importations of horses from the Eastern nations and the south of Europe. Early in the seventeenth century, King James I. bought of Mr Markham an Arabian horse imported from the East by the latter. This horse is reported to have been the first of that breed ever seen in England; but it would be hard to establish the truth of this assertion. Since Britain long continued to be a dependency of Rome, herself the mistress of the whole civilised world, so that lines of communication were constantly open from east to west, and especially traversed by the armies of the Empire, is it not probable that Roman officers availed themselves of opportunities of possessing Eastern horses, and that some of these accompanied them into the far West? To show that the English horse was of no mean character when the Arabian above alluded to was brought over, I will quote the authority of one who was generally reputed the best judge of horses of that time. The Duke of Newcastle, speaking from his own knowledge, "describes the Arabian which was imported and sold by Mr Markham to the King to have been of a bay colour, a little horse, and no rarity of shape." (*Beranger.*) The value to be attached to the above quotation is the evidence it affords of the relative high standard of the English horse of the time.

In devising means to establish the best possible stamp of hunters, our wisest course is to take systematically into consideration the prevailing defects in the breeding of the several distinct classes of horses from which the supply is derived, more especially those classes whence the most powerful and active mares should come. Disregard for the equilibrium to be kept up amongst these several classes has been a potent cause of the falling-off in the number of good hunters of late years. During the progress of descent through successive generations, there are always agencies in operation which tend to make horses become lighter and lose stamina, unless rational management keeps the stock strong and pure. Simple neglect produces deterioration, especially if it leads to the use of a bad stallion. Bad blood-horses have been too much used, and mares of their stock too often retained to supply the places of their dams and grandams, while the sale of the latter has often proved a permanent loss both to the breeder and to the district to which they belong. With the increased demand for exportation of the finest mares, the difficulty increases of supplying their places, and even producing stallions of their class; indeed, the course of events leads rather to total dispersion than to mere deterioration or numerical scarcity. Though I submit that good blood-stallions are alone reliable for the production of hunters, and that the mares should



also be closely up to the required standard for speed, and whilst power and stamina should form the leading features in their character, I am in no way inclined to dogmatise on the exact amount of pure blood which affords the best promise of combining all the essentials in the clever hunter.

The meaning which the words "half-bred" and "three parts bred" commonly convey, whether used technically or literally, is most inexact and vague. We may instance "The Lawyer," a horse still in training, which has proved himself to be one amongst the very best horses of his year; yet he is called a half-bred horse, though he has descended from the choicest of blood-sires for six or more generations, and on the dam's side to the remotest point to which the pedigree can be traced. The first ancestress named is the renowned "Jenny Horner," considered the best cocktail of her time, and that some sixty or seventy years ago. It would seem that Sir Tatton Sykes bred from "Jenny Horner's" descendants, and at an earlier period used them as hunters. The question is thus opened whether some of the most promising amongst the intermediate line of produce might not have proved successful racers, as it was only through the accident of his being trained that "The Lawyer" was found out to be the speedy animal he is.

I believe that to place horse-breeding on a secure basis, the pedigrees of more than one recognised class should be kept for public reference, in the same way as the General Stud-Book has been for the blood-horse during more than a century and a half. The word "difficulty" stands in the way of all new measures; but the way to set about establishing such a register was never so plain as now. The Royal Agricultural Society of England, the Highland and Agricultural Society of Scotland, and an analogous Institution in Ireland, could together accomplish more good in the direction indicated within a few years, than could formerly have been effected in a much greater length of time by a long series of trials.

The example set in the establishing of herd-books, and registrations of the produce of greyhounds and other dogs, encourages me to think that the difficulty in the more important case of the horse is more imaginary than real. Indeed, the longer period during which the horse lives and continues to propagate, and the relative slowness with which changes are effected in the race, render registration in their case more easy as well as more imperative. If the question be raised, how shall we get a satisfactory starting-point? our past history will give the best answer.

The important step taken under the auspices and by command of Charles II., in the seventeenth century, with reference to the blood-horse, might have been deferred indefinitely had not the scruples, which in every similar case present themselves, been overcome. At that time a commission was issued to select and collect a number of the purest mares and stallions of oriental descent that

could be found. These formed what was called the Royal stud, the nucleus from which sprang the far-famed English blood-horse. The wisdom of this measure has never been questioned, neither has the way of its execution.

The original blood-horses evidently did not all come from one particular stock. Damascus and Aleppo supplied some ; but, apart from traditional history, we can still trace in the stock of the present day some specialities in the character of the different lines which indicate a distinctive origin. Blacklock and his progeny stand in remarkable contrast to Whalebone and his, exhibiting the special characteristics of their ancestors, whether they be traced back to Highflyer and Herod, as the representatives of the stronger outline, or to Eclipse as the representative of the finer Arabian cast. Yet the finer shades of difference which the subsequent intermixture of stock of different qualities has produced, exceed our powers of discrimination.

The position of our colonies may afford us a useful illustration of the manner in which a register for any breed of horses may be started. Such colonies as Canada, Australia, New Zealand, the Cape, &c., are in many respects as well adapted to the horse as the mother country. It is as important for these States as for ourselves that horse-breeding should go on systematically, and not be left to chance. They have, therefore, strong inducements to form a register ; but their own peculiar uses, predilections, and climates will determine the character of that register, as well as that of their purchases and general management. It seems just as easy for any of these to begin with two or more Clydesdale mares and stallions, certified as of pure caste by the Highland Society's judges, as to begin with blood-mares and stallions vouched for by the Stud-book ; in both cases a new register begins ; and if, instead of these two classes, Yorkshiremen should take their Clevelands, the Norfolk farmer his trotter, the Suffolk man his punch, and the Irishman his hunter, it is not apparent why these several classes could not be kept pure, and crosses afterwards carried on with a knowledge of what was being done, and consequently a more correct anticipation of the result. If this could be done in the colonies, there can be no valid reason urged why it cannot be effected in this kingdom.

Greater changes have been made in the breeding and management of horses in England during the last fifty years than in any similar period on record ; but these have not rested on any sound basis. Horse-dealers' suggestions, capricious demands which temporarily influenced the market, have led men to alter their conduct with as little consideration as they changed their vests.

Few good judges, and especially among those who can remember longest, see reason for congratulation on comparing the present with the past, particularly with reference to the hunter, and the high class hack, and carriage horse.



Meanwhile in those animals which propagate, and therefore multiply more rapidly, such as dogs, pigs, fowls, and even sheep, great changes have been effected by individual enterprise in a few years ; whilst the horse, the favourite of princes and nobles, appears to require to be specially fostered by the patronage of the great, or by union and concert among the many.

Hunters have usually been identified with the country in which they are bred. We pronounce a horse to be of Yorkshire, Shropshire, Norfolk, or Irish breed, from his characteristic form ; but these have had in the main a common origin, represented in the blood-horse ; though the influence of soil and culture together, in great measure, fixes their character and decides their worth.

Too much stress cannot be laid upon the judicious management of mares and foals : with care, useful horses may be reared from indifferent stock ; whilst without it, the produce, though well descended, will not be worth their cost. In feeding young stock, extremes should be guarded against ; liberal keep, on sound grass, with corn and hay in moderation, proves the most economical in the end. If more food be given than the system can assimilate, superfluous bulk will be produced at the expense of strength and stamina, and the digestive system will be deranged.

The same rule applies to exercise, shelter, and warmth ; for the first, space and liberty are essential, and as regards temperature, it is neither practicable nor desirable for horses that it should be constantly equal. Wet and cold, however, are uncongenial to horses, which should be provided with means for at least voluntary shelter.

If horses be properly fed, are protected from rain, and have a dry surface under foot, with space for voluntary exercise, the temperature of an ordinary winter is salutary to them. The horse's coat, then, with the secretion going on over the surface of his body, equalises and regulates the bodily heat. Horses in a roomy paddock do not suffer from a shower in summer any more than school-boys in a cricket-field ; but long exposure to rain in a confined space is injurious to them.

The question of blood *versus* bone is so often raised without receiving any satisfactory solution, that I am induced to make a few remarks on it.

The practice of cross-breeding is constantly resorted to by farmers, sporting and amateur breeders of various animals, all of whom have evidence to show that they can produce certain desirable qualities in the offspring which neither of the parents possessed. The mule may be referred to as a case in point : here we find the produce much superior in size, power, and action, to the ass ; whilst its continuous powers of endurance under exposure to weather and privations, exceed those of the class of horse to which his dam belonged ; this superiority is in part traceable to differences in physical conformation, and in part to the temperament resulting from a com-

bination of races. In this case, however, nature has, as is well known, set a boundary to modifications of race, which protects the noble horse from becoming an utter mongrel.

Breeders of dogs obtain, even in the first cross, courage and larger size for hunting and other uses without the sacrifice of reliable exactness; those breeders, however, who succeed best, are most careful to select from types of the purest blood on either side; and without the English bull-dog, the means of producing many of the most useful specimens, combining high courage and great strength with other requisites, would be wanting.

Since different classes of English horses varying in height, form, and power, are available for breeding hunters, these can be more readily brought to any standard desired than any particular race, even the blood-horse; power, speed, and bottom, are the first requisites in the hunter, in whom, if the first two qualities are combined, the last or staying power usually results as a consequence.

The height best suited for the hunter required to carry a given weight is a point on which turf statistics throw but little light. The Derby is sometimes won by a horse more than 16 hands high, and a little less frequently by one under 15, but in the majority of cases by horses which measure between 15 hands 2 inches and 16 hands; so that 15 hands 3 inches may fairly be laid down as the nearest standard height of the blood-horse; and within an inch under or over that standard will be found eight-tenths of the best race-horses and blood-stallions in England.

An attempt to produce horses of any given class much above its normal standard, will, with few exceptions, be realised at the expense of symmetry, action, and power, the latter being dependent on form. Where great power is required, and some of the speed of the race-horse can be dispensed with, the well-chosen blood-stallion may be put to a stout, well-formed, well-bred hunting mare, with a probability of the best result.

One of the greatest errors that has been made in the employment of thorough-bred stallions for country mares has been the preference given to the largest horses exhibited, particularly if these spurious monsters had a pedigree going back to "Eclipse" or "Childers." As a rule, the overgrown thoroughbred stallion, *i.e.*, those of about 16 hands 2 inches, have done harm in the counties where they have travelled.

When the powerful half-bred mare breeds to the blood-horse, there is always a disposition in the produce to increase in height and length. Some of the largest, ill-formed, and least useful horses have been the produce of bad, overgrown blood-horses and Yorkshire mares; the stock often exceeding 17 hands in height. On the other hand, the old Cleveland horse, on short-looking legs (short because of his deep and wide frame), measures, when of the best form, about 16 hands; and from mares of that stamp, and a good blood-horse of 15 hands 2 inches, it is easy to produce in the second



or third generation hunters which could carry 18 stone over a heavy country, and jump double fences, despite the ground and weight. Though the present requirements of Leicestershire can hardly be met by one or two crosses of blood, still it is important to know how size, with good form, may be had when wanted.

In selecting a mare to breed hunters, form is usually more regarded than pedigree; not that knowledge of descent is unimportant, but because, with all but blood-horses, it is commonly so very hard to go far back—nay it is good policy, when doubt arises, to stop inquiry, *lest more than the truth should be heard*.

Young mares should be selected in preference to aged and hard-wrought animals; the latter being uncertain till tried. Exception, however, should be made in favour of a mare of ten or twelve years, which had produced some good foals; if sound, she is in her prime. Those destined from the first for breeding, should be put to the horse at three years old, instead of being left barren till a year or two later, as is commonly the case; if they have been well kept, they will be sufficiently developed at that age.

Mares of the stamp for producing hunters are very scarce now, as may be inferred from the small number presented at exhibitions of general stock; yet, with our climate, soil, and national resources, the few good animals still obtainable for breeding would suffice for laying a foundation, if breeders were encouraged to produce and keep stock of the right sort.

The real good half-bred stallion—such as we used to see, with his large clean legs, well-defined knee, hock, and pastern joints, with good head, shoulders, barrel, and hind quarters—is now become scarce; these horses when about 16 hands high, formed a connecting link between the thorough-bred and the stronger classes; from such sires, mares fit to breed hunters used to be obtained, besides many of the most valuable horses in England for general purposes; of late years, whenever such a stallion has made his appearance, it has only been to be favoured with a few mares preparatory to his being exhibited, and then sold to go abroad. To find a really good half-bred stallion of this old stamp, at five years old, has to the writer's knowledge been a rare occurrence during the last ten or fifteen years, even in the first horse-breeding districts of the kingdom.

To do justice to this subject it must be regarded both in its general and particular aspects; individual breeders who seek to promote their own particular interests, cannot be expected to take as broad a view of this question as constituted bodies like the Royal Agricultural Society, which is founded to promote national improvements; yet the breeder who succeeds in producing fine specimens of the class of horses best suited to his locality and requirements, will promote the general good; whilst by classifying and bringing them into notice, the Royal and other Agricultural Societies will do their part.

The breeders of horses are for the most part either wealthy ama-

teurs or tenant farmers ; to the latter we must turn for the general supply of every description, the race-horse excepted, though it must be admitted that English horses of the best type owe their state of perfection to royal, noble, and gentlemen amateurs. At the present day the stud belonging to Her Majesty forms a model to all breeders and to royal patronage was due the high perfection to which the English blood-horse attained during the last and previous centuries.

From 1750 to 1764 inclusive, three horses were bred in England, by His Royal Highness the Duke of Cumberland, uncle to King George III., which together did more to advance the value of the English horse, than any set of incidents on record. The horses alluded to, were Marske, King Herod, and Eclipse. If we pass over the first-mentioned horse Marske, because he was the sire of the last—Eclipse—we still have in the other two the elements of an entire reformation in the character of the blood-stock of the kingdom. The sons and daughters of Herod and Eclipse are unexampled for their character and numbers ; and through these in parallel lines, we obtained such a stock as no other country has possessed. So effectual has been the patronage of those in high station, in advancing the improvement of our horses, that whenever we search out the origin of any of our best blood-horses, without which the hunter could not have attained his special excellence, we find in almost every instance some cherished historical name connected with him as the breeder.

*(To be continued.)*



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### THE COMING SESSION.

To novelty belongs the power of charming, but only to truth that of always instructing; and truths, however old, far from losing any of their virtues with the lapse of years, like good wine, improve with keeping. Some truths are of such cardinal importance that they cannot be cherished too steadfastly, or counted too often; and it is far better to incur blame for jealousy, than negligence, in their behalf. If old students—(and under this head we include all the worthy members of our body who hold the true doctrine that a good man is a student all his life)—are afraid of being bored by the observations about to be submitted, they must at any rate acquit us of intention to deceive them with the title, as plain as it is short: “*The Coming Session*” is the suggestive theme, and “*The Coming Men*” are those whose attention we more particularly crave.

Assuming that every young man who is about to enter at one of the Colleges has fairly made up his mind to the Veterinary Profession as his calling, we leave to the respective Introductory Lecturers, the preliminary sketches and relations of the various branches of study:—How Anatomy is the necessary foundation of Physiological Science—how this is indispensable to the Study of Disease—how Hygiene and Therapeutics are inseparably linked—why Science and Practice must ever go hand in hand; these and other allied propositions, albeit enticing and full of promise, are not what we are about to dilate upon. Just now we are more intent upon a chat as men of the world than inclined for a lecture, which, however instructive, is apt to be a little formal, and in danger of being almost as heavy as its truths are intrinsically precious.

Success is, of course, what every one desires; the great question is how to attain it with the greatest certainty—how to reduce to the lowest figure the chances of failure. It is admitted that in every calling certain general conditions are indispensable to success; a man must well learn his business, and, having learned it, pursue it with single aim and thorough earnestness. A cultivated mind, a genial nature, a skilled hand, are one and all indispensable in various degrees in most walks in life, and he who conjoins these attributes will be found qualified to be the best country gentleman and the ablest surgeon, the most accomplished artist and the most distinguished

officer, the best sportsman and the most successful farmer—in few words, the best man under circumstances the most diversified.

We know of no vocation in which, more than in the veterinary profession, the combination of a cultivated mind, a genial nature, and a skilled hand, is required.

The advance which has been made in the last few years towards a correct appreciation of the high and legitimate claims of Veterinary Science is, though very considerable, small in comparison to that in store. We have only to be true to ourselves, and to confer on the public all the advantages which it is in our power to bestow, by an intelligent and earnest practice of our profession, to earn the full return of public esteem and its attendant material benefits. The number of stock, already enormous, is still rapidly on the increase; the ever-growing number of horses, called for by the expanding wealth and trade of the country; and the diffusion of knowledge on the laws of health and the prevention of disease, offer the most promising opportunities to veterinarians possessing a full mastery of their subject, and bent on extending its boundaries and practical applications. But the most instructed mind must work at great disadvantage if its possessor be not of a genial nature, and if he have not taken care to fit himself for hard work, in the thousand and one emergencies of every-day professional life, be it in a city or on a moor, in the camp or on the farm.

Unfortunately, men of an intellectual bent are apt to disregard the necessity of cultivating minor yet indispensable qualifications; while others, who are by nature gifted with tact, quick perception of difficulties, and power of practical execution, are prone to disregard the great advantages of culture of the intellectual faculties. Success is what is wanted; the best way to make sure of it is not to throw away a chance, not to neglect a single opportunity. The profession must be thoroughly learned in all its branches, and practised with business-like punctuality, and with thorough heartiness.

A professional man cannot do better than bear in mind, that he is a public man. Every one who requires him has a moral right to his best services; he is a referee supposed to be always ready to give counsel and to arbitrate; and his testimony is often sought in courts of law as the most important element in judicially determining matters in dispute. Such a man should strive to win esteem as much for his sobriety of judgment as mode of life; no less for his uniformly strict impartiality than for his uniformly urbane demeanour.

What should especially distinguish members of the same profes-



sion is, good feeling and honourable conduct amongst themselves. In the exercise of the many responsible duties of a difficult calling, a full knowledge of which is still far from having been attained, it is impossible that all opinions can coincide, while it is reasonable to presume a common liability to err in judgment now and then. Under these circumstances, every one should be careful in expressing his own opinion, tolerant of that of his brother, and especially moderate, if he be consulted, when an error has been committed. Every generous professional man should scorn to win repute at the expense of another's failing, and ever be ready to extenuate misadventures by every argument he can adduce within the limits of the truth.

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### VETERINARY JURISPRUDENCE.

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#### BREACH OF WARRANTY OF A HORSE.

GEORGE BENJAMIN *v.* GEORGE HOLMES.—A JURY CASE.

*(From the Wiltshire Independent, September 17, 1863.)*

Mr BARTRUM, of Bath, appeared for the plaintiff; and Mr ROWLAND, of Hungerford, for the defendant.

This was an action brought by the plaintiff, a coal-merchant carrying on an extensive business at Bath, against the defendant, a farmer living at Wootton Rivers, in this county, to recover L.25, Os. 6d., for the breach of a warranty of a horse.

Mr Bartrum, in stating the case to the jury, said the plaintiff complained that at Tan-hill Fair he bought a horse of the defendant's wife for L.30, to which he received one of the most satisfactory warranties that it was possible to receive. The horse was warranted sound and a good worker, and the animal was taken home with the greatest care and circumspection, for in order to satisfy himself that there should be no blame attached to the driver, the plaintiff went himself with the animal to Bath. To Mr Benjamin's surprise, on the horse being taken out of the stable next morning, it was found to be very lame. Mr Benjamin at once had his horse consigned to the care of a most respectable veterinary surgeon, —Mr Broad, of Bath—and from what passed between them, a letter was written to Mr George Holmes, the defendant. [The letter, which was read, was to the effect that finding the horse to be lame, the plaintiff had that day had him examined by a veterinary surgeon, whose certificate he had enclosed. The certificate stated that Mr Broad had that day examined a bay gelding belonging to Mr Benjamin, and he found it was lame on the fore-foot. This Mr Broad attributed to its very flat and weak fore-feet.] This letter had been written the very morning after the horse had been purchased at Tan-hill Fair. In reply, Mr Holmes wrote a letter. [This was read. It was in substance that the defendant was greatly surprised to learn that the horse was lame. There had never been the least fault to be found with the animal; he had always been perfectly safe and free from vice, and the defendant did not consider himself responsible for any accident which might have taken place since. The animal was well known in the village to be an excellent horse, and without any fault, and the formation of his feet could be seen at the time he was bought.] Mr Broad was of opinion that the fault was a permanent one,—the heels touching the ground, so that the frog, the part which ought to be protected from pressure, was not so protected, but actually pressed on the ground. This must have been known to the defendant, because

the shoe was an irregularly-formed one. This, however, would not appear at Tan-hill, because the plaintiff had then no opportunity of trying the horse on the high road. The horse might have gone on very well indeed on a farm ; but when he came to be driven on the road, he turned lame. It might be that the jury would have called before them veterinary surgeons on behalf of the defendant, but "the proof of the pudding was in the eating," and here was a demonstration that the horse was unsound, for a certificate from Mr Broad was sent which stated that the horse was unsound. After being kept for some time, the horse was put up by public auction, Mr Holmes having every opportunity given him for attending the sale, notice having been given and a handbill also being sent to him. The horse was sold in the Bath market, and it went into the hands of a perfect stranger, fetching L.7. A number of persons were present at the sale ; and the witnesses would tell them that the horse was irretrievably lame. He thought the jury would come to the conclusion that everything with regard to plaintiff's conduct had been done regularly, and had the defendant been disposed to do what was just and fair, the action would not have been brought, for all the plaintiff wanted was that the animal should be taken back, and his money returned. Everything had been done with a view to settle the matter ; but as the defendant refused to do that, he was responsible for being summoned before the jury.

The plaintiff was then called, and, on being sworn, said—I am a coal-merchant at Bath, carrying on an extensive business in succession to my father. I was at Tan-hill Fair on the 6th of August. I bought a bay gelding of the defendant's wife. I had no opportunity of trying the horse on the road, the fair being held on the turf. The horse appeared sound when purchased. The defendant's wife said it was five years old. I paid a cheque for L.30 for the horse, for which I had a receipt. I saw the horse taken home. I rode a slight distance behind the horse, and it came home very quietly and coolly in about three hours. It was dark at the time, so that I could not say whether it was lame. I saw the horse the next morning about six o'clock. On the near fore-foot it went very lame indeed, when it was brought out of the stable for water. In consequence of that I sent for Mr Broad, the veterinary surgeon, who came to me, and in consequence of a communication from Mr Broad I wrote to the defendant. [The letter, together with the certificate, were put in and read. The reply of the defendant was also read.] I kept the horse at my own establishment for two or three days, for which no charge is made in the bill. As soon as I received the defendant's reply, I sent it to Mr Broad's establishment. The horse was ultimately sold by public auction in the Bath cattle market, on the 15th of August, Mr Henry Howell being the auctioneer. On the 10th of August I wrote a letter to the defendant, informing him that the horse would be submitted to public auction, and that the horse was older than his wife alleged. I subsequently sent a handbill to the defendant. I received an account from Mr Howell, stating that the horse was sold for L.7. My business is principally in Bath, and it is of course necessary that I should have a sound animal. I don't know where the horse is, or who purchased it, and I had no hand whatever in repurchasing the horse.

Mr Rowland (in cross-examination)—I conclude you have a good many horses. Without being very impertinent, may I ask what is your stock of horses ?

Plaintiff—About ten or eleven.

Mr Rowland—Where do you generally buy them ?

Plaintiff—Generally at home.

Mr Rowland—Had you bought any at Tan-hill before ?

Plaintiff—I bought some at Tan-hill the previous year.

Mr Rowland—How did they turn out ?

Plaintiff—One very well, and one did not.

Mr Rowland—Did you serve the one that did not turn out well the same as you have used this ?

Plaintiff—I returned it.

Mr Rowland—Then you went to Tan-hill with your eyes rather wider open than usual ?



Plaintiff—Not particularly.

Mr Rowland—Did you tell Mrs Holmes that you had been taken in last year, and that this year you would prefer trying a horse out of a farmer's team?

Plaintiff—I have no recollection of anything of the kind.

Mr Rowland—Words to that effect?

Plaintiff—No.

Mr Rowland—Very well. If your memory don't serve you, I won't press it. If you returned the horse last year, why did you not return this?

Plaintiff—I did return this one in the way I did the one last year.

The plaintiff was somewhat closely pressed in reference to this point, but he said—The horse last year actually went back. I am rather more than twenty miles from Tan-hill. Perhaps I am six miles from Tan-hill now. I should think it is twenty-five miles from Tan-hill to Bath. The horse was trotted at Tan-hill. The animal jerked out of my friend's hands who held it. I considered the horse to be sound on the faith of the warranty given me. I bought three horses at Tan-hill that day. A drover rode one, and led the other. He rode this horse which is now in dispute; the former answer was an error of mine.

Charles Book, a haulier, living in Bath, who had been seventeen years engaged in that trade, said, he saw a bay gelding to be sold by Mr Howell in August last. There was only one horse sold on the 15th of August. The horse was very lame in the near fore-foot when sold. Witness had intended to purchase him, but he was so lame that he did not. There were a great many persons there. It was ultimately bought by a cattle-dealer for L.7.

The witness was not cross-examined.

William Tanner, a horse-breaker at Bath, where he had been ten years, said, he took a bay gelding from Mr Broad's yard to the market on the 15th of August, and he saw him sold. The animal was very lame on the near fore-foot. He fetched L.7. There was a "good parcel" of people there.

Mr Bartrum—Could you venture an opinion as to what produced the lameness?

Witness—I looked at the heel, and the horse had very low heels, and he was shod according to it. I should think that was to keep the frog off the ground as much as possible. A horse that would work well on a farm would go lame when it came on the streets. I have known many such instances. If his feet would have stood, this would have proved a serviceable horse about the Bath streets.

Mr Rowland—Don't you suppose there are hard roads about a farm?

Witness—By all means. By going on the road one day, and the farm another, he might not "show lame." I am not in Mr Benjamin's employ. I got half-a-crown for taking the horse down.

Mr Rowland—Oh, I don't see 2s. 6d. down in the account.

Mr Bartrum—Then that's 2s. 6d. more for Mr Benjamin. (Laughter.) We ought to have increased the damages by 2s. 6d. (Laughter.)

Mr Thomas Broad, veterinary surgeon at Bath, where he has been in practice some years, was then called, and he said—I remember a horse being brought to me from Mr Benjamin to be examined; and I am the author of the certificate put in to-day. The horse had naturally badly formed feet—weak low heels with very little crust, and he was quite lame in the near fore-foot.

Mr Bartrum—Should you say that the lameness was irremediable?

Witness—Yes. The horse was not able to bear road-work, but the immediate cause was the thick shoes to keep the frog off the ground, and they caused a greater amount of pressure on the heels, which were weak.

Mr Bartrum—Is it your opinion that the horse was sound?

Witness—In my judgment the horse was certainly not a sound horse. Even shod with leather he was not a suitable horse for road work—the feet were not fit for road work at all.

His Honour—That was from their natural formation?

Witness—It was. If that horse had been worked on soft land, it might not have gone lame, although it might have occasionally worked on the road. A journey of twenty-five miles on the hard road would have an effect on the horse.

With such feet as that it might not necessarily produce lameness ; but if repeated for three or four days I should expect to find it. I kept the horse for several days. The horse was off six and rising seven. I believe that opinion to be correct.

Cross-examined—I saw the lameness as soon as the horse came. A cart-horse ought not to be put off a walk ; he ought not to go more than about five or six miles an hour. The shoes were taken off both feet, and I examined the feet thoroughly. I think such a journey from Tan-hill to Bath, as I have heard described, might have caused lameness. In re-examination, witness said he should not call such a horse a serviceable horse.

Mr Henry Hussey, veterinary surgeon, of Devizes, said, a horse with low weak heels would not answer the description of a sound horse. Horses with low heels can at no time stand the road ; they may not go lame the first, second, or third journey, but they are sure to do so ultimately. A journey from Tan-hill to Bath might produce the lameness ; but the disease of the horn must be of long standing, and might take a long time before it would show.

Mr Bartrum proposed to recall the plaintiff, in order that he might be asked a question with reference to the time of the journey ; but

Mr Rowland strongly objected to this, and urged that his learned friend saw where the shoe pinched, and therefore he wanted to alter it.

Mr Bartrum—I think the horse-shoe pinched. (Laughter.) I thought my friend wanted to try the case on its merits, and now he is trying to burk it. (Laughter.)

Mr Rowland said he was not going to burk the case, as his friend would see presently ; but he was not going to allow his friend to recall the plaintiff without taking the strongest objection to it.

This was the case for the plaintiff, and in addressing the jury for the defendant, Mr Rowland explained how it was that a lady was in the position of a horse-dealer at this fair, a circumstance most unusual. Mr Holmes, of Wootton Rivers, was a man known by reputation not only to him (Mr Rowland), but to the greater portion of the county of Wilts, and a more respectable man as an agriculturist he (Mr Rowland) ventured to assert did not exist.

His Honour interfered, by observing that they were not trying a question of character. The question before the jury was simply that of soundness or unsoundness.

Mr Rowland apprehended that there was a question of character, because if he charged the defendant with giving a false certificate——

His Honour—Pardon me. The giving of a warranty, and the horse afterwards going lame, may be consistent with the most complete honesty on the part of the woman. Nothing, I understand, is alleged against the character of the defendant.

Mr Rowland said, the witnesses had to some extent coloured their case, and he thought he had a right to comment on it.

His Honour—If we get into the question of character, we lose sight of the real question at issue.

Mr Rowland—Very well, your Honour. If it is to turn on a question of soundness or unsoundness, I am content to let it stay there. If I am stopped——

His Honour—I don't stop you in anything unless it appears to me irrelevant. No imputation has been cast on the character of the defendant, and therefore any remarks that you may make have no connection with the question at issue.

Mr Rowland said he must bow to the decision of the Court, and he then continued his address to the jury by observing that in the business of Mr Holmes the horse was worked from the day he was bought to the time he was sold. He had not been put into a stall to be made to look well ; but he was taken out of the stable on the morning of the fair, and taken to Tan-hill. He had been worked in all manner of ways, and at anything at which he was wanted to be worked. Mrs Holmes sold the horse to the plaintiff, giving him a written warranty, the piece of paper containing a receipt as well as a warranty. He did not wish to make any objection to that, although it was open to this remark, that it was not in the handwriting of Mrs Holmes, but was brought by Mr



Benjamin to the fair, Mrs Holmes simply signing her name to it ; but as the signature had been given, of course his client was responsible for it, and he was content that it should be so. A general and broad warranty had been given that the horse was a good worker ; but if they put him to any work to which he was not accustomed, it was at the plaintiff's own risk. But was it the working on the Bath stones that ruined this horse ? Nothing of the sort, for he never went on the Bath stones. The jury had seen where the shoe pinched a little, and they had also seen where Mr Bartrum tried to mend it. Was twenty-five miles in three hours a pace for a cart-horse to go ? It was a downright insult to common sense to ask them to believe it ; and Mr Benjamin saw that he had a little bit over-worked the horse—he saw that the animal broke down between Tan-hill and Bath. It was in that journey the horse was lamed, and common experience told them that a horse might go out right, and come in lame ; but would they send that horse to a veterinary surgeon, and sell him as an unsound horse, or would they not see whether it was a temporary injury or a permanent one ? He believed, however, that that was not the way they did business in the West of England, for he remembered a case somewhat similar to this at Marlborough. All he (Mr Rowland) asked the jury to believe was that this horse was sold in the *bonâ fide* belief that he was sound, and his witnesses would prove that fact——

His Honour—Surely you don't mean to argue that although under those circumstances the horse was unsound, the warranty would not avail ? These remarks might be very important on the question of character ; but they are wholly unimportant on a question of law. What has the defendant's belief to do with the present case ? He may have believed that the horse was sound, but that won't avail. You gave a warranty, believing the horse to be sound ; the horse turned out unsound, and your warranty makes you responsible.

Mr Rowland—I submit that we are not responsible beyond the question of our warranty.

His Honour—Certainly not.

Mr Rowland—Then we have not given a warranty beyond what we are prepared to prove.

His Honour—Do you mean to say that if you believe a horse to be sound, and with that belief you gave a warranty of the soundness, and yet though it turn out that it was unsound, that you are not liable ?

Mr Rowland—Yes, I do. I submit this was a limited warranty.

His Honour—You may argue that the horse was sound, but that is quite another thing.

Mr Rowland—Then, your Honour, I have no case.

His Honour—How can you say that ? You don't distinguish between the two things. I have no doubt you have evidence that the horse was sound. You put it to the jury just now that the defendant believed his horse was sound, and although he gave a warranty, and the animal proved to be unsound, he was not liable.

Mr Rowland said he was not prepared to argue the case on the broad footing just put by his Honour.

His Honour said he had never known Mr Rowland wilfully to mis-state anything ; but the argument he had just propounded was an erroneous proposition of law which he could not allow to pass unnoticed.

Mr Rowland said he had been twice stopped in his address to the jury, and he therefore preferred to let the case go on its own merits.

His Honour—Don't be hasty.

Mr Rowland, after some hesitation, said he would not proceed with his address, and he then called

Mrs Jane Holmes, who said—I am the wife of Mr George Holmes of Wootton Rivers, who is an invalid. I remember going to Tan-hill fair this year with my son, and three or four horses. There was a bay cart-horse which I had had in my possession for three years. I sold it to the plaintiff for L.30. During the time we had that horse he was never lame. He was frequently on the hard road. The

horse was constantly working up to the fair, and was not "made up" for sale. A few weeks before I refused L.25 for the horse. I signed the warranty, having previously read it. I sold two horses, but I gave no warranty with the second.

His Honour—What was done with the second horse has nothing to do with this case.

Mr Bartrum—Who bought the second horse?

Witness—Mr Jones.

Mr Bartrum—There are a good many Mr Jones's. (Laughter.)

Witness—Mr Jones of Marlborough. We had worked the horse for some time. I think we bought him when he was "two off." I forget what part of the year we bought him. I have used the horse for the usual farm purposes—he would go on the road, and also on the farm.

Mr Bartrum—Was not one of your horses given to shying out his fore-feet?

Witness—I can't say, I never shod him. (Laughter.)

Mr Bartrum—You know where the shoe pinches?

Witness—We have a horse that throws out his fore-feet, and knocks off his shoes sometimes.

William Martin, carter for Mr Holmes at Wootton Rivers, said he took this bay horse to Tan-hill fair. During the two years witness was carter, the horse was put to any sort of work, plough, harrow, dung-cart, fore or behind, or any place where you liked to put him. (Laughter.) He had never gone lame during the two years.

Cross-examined—The horse has been put out to grass, night and morning. My master had five cart-horses, but we had not work enough for more than three. The pony sold was one of the horses rested. The horse sold to Mr Benjamin had been worked every day for three months.

His Honour—Had the horse been on the road?

Witness—Yes, it had been for eight or ten days before it was sold. We never had a farrier to him all the time we had him. (A laugh.)

John Goddard, a labourer in the employ of the defendant, said he went with these horses to Tan-hill fair; Mr Benjamin came up, asked the price of the horse, looked at the horse's mouth, and witness told him he was "five off." He told plaintiff if the horse had any faults he could see them. Witness had seen this horse for two years, and he knew he had been on the road and farm. He had never seen the animal lame. He had been working for Mr Holmes on and off for three years, and from before last harvest constantly.

William Fidler, farrier at Wootton Rivers, said he knew this horse of Mr Holmes's, and he had shod him since last Christmas. He had seen nothing particular about the formation of his feet. Some little time previous to the fair he did not "shoe him up" for the fair. He had often seen the horse before the fair in a cart or waggon, and to his knowledge had never seen him lame.

In cross-examination the witness said he did not know how many times he had shod this horse in a year; he had not his book with him. (A laugh.) He knew that the horse had been several times on the road. He had shod about five horses of Mr Holmes's.

Mr Bartrum—They were brought to you, I suppose, when they wanted shoeing?

Witness—No, they were not, for we attended on them at the stable. (Laughter.)

Mr Bartrum—How many geldings had Mr Holmes got?

Witness—I forget whether they are geldings or mares.

Mr William Buckeridge, veterinary surgeon, of Hungerford, on being called, was shown Mr Broad's certificate. He then stated that a horse with broad and flat fore-feet was not necessarily unsound. Horses with flat feet were generally as sound as horses with ordinary feet. They were generally sounder when they had been working on the roads. Witness had heard the journey from Tan-hill to Bath described by the witnesses.

Mr Rowland—Might a horse have been sound that morning, and have become permanently unsound from injuries received on that journey?



Witness—He might.

His Honour—This is important, and let me take it carefully. Do you mean to say, Mr Buckeridge, that if the horse was taken twenty-five miles in three hours, it might receive permanent injury?

Witness—I mean to say that a horse might receive an injury which would render him permanently unsound by his stepping on a stone or kicking against some hard substance.

Mr Bartrum (in cross-examination)—Should you, as a veterinary surgeon, recommend a customer of yours to purchase a horse with flat feet?

Witness—Recommend, sir?

Mr Bartrum—Would it be judicious to select a horse with flat feet?

Witness—Certainly not.

Mr Bartrum—Don't you know it is the very thing to avoid?

Witness—Yes; but it don't constitute disease.

Mr Bartrum—Is it judicious to purchase a horse with flat feet?

Witness—I should not purchase a horse particularly with flat feet.

Mr Bartrum—Don't let us have conditions. Would you have purchased a horse at a fair price?

Witness—Yes.

Mr Bartrum—Would you recommend others to buy a horse with flat feet?

Witness—No.

Mr Bartrum—Then there must be some good reason why you would not. What is it?

Witness—In travelling a journey like this, it would be very liable to tread on a stone. These horses are more likely to be injured than other horses, but they are not so liable to chronic diseases as others.

Mr Bartrum—Are not flat-footed horses subject to a disease called lamnitis (fever of the foot)? This will appear in a veterinary journal, so pray be careful.

Witness—No, I don't know that they are.

Mr Bartrum—Now, if a horse has low heels, is it not liable to become lame?

Witness—It would want careful shoeing.

Mr Bartrum—I did not ask that. Is not a horse with low heels liable to become lame?

Witness—Not if he were properly shod.

Mr Bartrum—You have heard the evidence of the witnesses; to what do you attribute the lameness of the animal?

Witness—I did not see the horse before the sale.

Mr Bartrum—You have heard the evidence; what reason do you assign for the lameness?

Witness—According to the blacksmith's evidence there was a good foot, and I should think it met with an accident. He might have struck his toe against a stone or some hard substance, and thus have produced inflammation in the covering of the bone, or in the bone itself.

Mr Bartrum—Lameness might be produced in a single night by that?

Witness—Oh yes; in a minute or half a minute.

Mr Bartrum—Permanent lameness?

Witness—Yes, after an accident. The horse might not be lame until he came to rest, or it might show itself at the time.

Mr Bartrum—Suppose the horse had trod on a stone, would that produce permanent lameness?

Witness—It might or it might not.

Mr Bartrum—Then do you mean to say that a flat-footed horse is a sound horse?

Witness—Yes.

Mr Bartrum—A horse with a flat foot without a crust—that is a sound horse?

Witness—Yes.

Mr Bartrum—Is that a natural foot?

Witness—Yes. You would find colts out at grass so.

Mr Bartrum—In a six-year-old horse would you find a sound horse possessing a flat foot with low heels and no crust?

Witness—You might. If a horse was so when young, he would be so when he got six years of age?

Mr Bartrum—How long have you been in the profession?

Witness—Nine years.

Mr Bartrum—Admitted nine years.

Witness—Yes.

This being the case for the defendant.

Mr Bartrum replied, commenting on the extraordinary hypothesis just propounded by Mr Buckeridge, and remarking that if the human flesh were liable to all sorts of ills, he did not know what to say about the poor horse-flesh, if it were so liable to be knocked up. (Laughter.) He was sure the jury would place no reliance on such evidence. Mr Bartrum then contrasted the evidence of Mr Broad with that of Mr Buckeridge, drawing attention to the fact that the former had seen the horse. This case would probably, through the medium of the press, get into the veterinary journal, and he expected they would find a good number of notes of admiration placed after Mr Buckeridge's evidence. Mr Bartrum urged in conclusion, that the plaintiff was not seeking to gain anything by this action; but that he was simply endeavouring to recover what he was actually out of pocket.

His Honour summed up the case to the jury in a very lucid manner, drawing their attention to the fact, that there had not been the slightest imputation cast on the character of either party. The defendant's wife had given her evidence in an extremely creditable manner, and had any imputation been made there would have been nothing to justify it. Neither had there been the least imputation on the part of the defendant. The learned gentleman who appeared for the defendant was quite incapable of making any misrepresentation either of law or fact, but he (the learned judge) thought he was mistaken so far, if he thought that the belief of the defendant could in any way affect the warranty which had been given. Admitting that the defendant's wife fully believed at the time that the horse was sound, if a warranty were given to a plaintiff by a defendant or his agent, and the horse turned out to be unsound, clearly a plaintiff suing a defendant was entitled to damages. Of that there could not be the slightest doubt whatever, and this point he had been very anxious to clear up. The question for the jury to determine, was whether or not the horse was sound, and to give their verdict accordingly. One other observation he had to make to them was, that the burden of proof was on the plaintiff, and it was for him to satisfy them, by reasonable evidence, that the horse was unsound at the time of the sale. Then with respect to the damages, they might take the price given for the horse at the time by the plaintiff to the defendant, as fair and strong (though not conclusive) evidence of what the horse would be as sound,—viz., £30. If the jury considered the sale by auction to have been fairly conducted under reasonable circumstances, then they might take the price given as a reasonable test of the value of the horse as unsound. They had then to take into consideration such expenses as might reasonably be incurred by the sale, which only amounted to a few shillings. About the minor expenses there was no question. They had, however, to take into consideration the keep of the horse from the time the notice was given by the plaintiff to the defendant; and though they were not bound to give 18s., they ought to give what was fair for the keep of the horse during that time. He (the learned judge) did not understand whether or not the plaintiff sought to recover damages on the ground that the horse was not of the same age as stated.

Mr Bartrum—I am entitled to use a second string to my bow; but I don't think it will be needed.

His Honour, in addressing the jury on this subject, did not think there was much importance to be attached to this point, inasmuch as in the warranty the words were "a horse five years of age, warranted sound and good," so that he did



not think the warranty applied to the age. There was a principle—applicable to the circumstances of this case,—one which had been laid down by the superior courts of law, and one which was very simple and satisfactory in principle, however difficult it might be in application. It was this,—that any defect in the structure of a horse, whether congenital, or arising from subsequent disease or accident, which diminishes his natural usefulness, and renders him less than reasonably fitted for present use, is unsoundness. With these observations, his Honour carefully read over the principal portion of the evidence given, commenting thereon; and concluded by telling the jury that the question for them was,—was the horse sound or unsound? If they came to the conclusion that the horse was not sound, then they ought to find a verdict for the plaintiff, assessing the damages on the principle he had pointed out to them.

The jury consulted for some time in the box, but they were unable to agree. The foreman (Mr W. Hillier, of Devizes) inquired if the Court would take the opinion of the majority of the jury?

His Honour—Oh no.

The Registrar—If you cannot agree, gentlemen, we have locks and keys at hand. (Laughter.)

The Officer of the Court—I am waiting for them. (Renewed laughter.)

The jury returned a verdict for the plaintiff, and were about to couple with their verdict an expression of their opinion, that the plaintiff ought not to have driven the horse from Tan-Hill to Bath in so short a time, when

His Honour told them he could not take such a verdict. They had to do with nothing but the question,—was the horse sound or unsound at the time of the sale? The jury had better reconsider their verdict.

After a few minutes' further consultation, the jury returned a verdict for the plaintiff for the full amount claimed.

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## PERISCOPE.

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### ON THE "LAMB DISEASE," OF WHICH PARASITES IN THE LUNGS ARE GENERALLY THE CAUSE, OR CONSEQUENCE.

By EDWARDS CRISP, M.D., F.Z.S., late Physician to the Metropolitan Dispensary.

(From the Bath and West of England Society's Journal.)

#### PRIZE ESSAY.<sup>1</sup>

(Continued from page 583.)

The next worm, which I have found chiefly in the *ileum* (the intestine before the large gut) is shorter, obtuse at both extremities, with a cup-like mouth, which in one specimen only was surrounded (or seen to be surrounded) by a circle of hooklets;<sup>2</sup> the mouth is divided by a septum, and the *oesophagus* (gullet) is double. Strong muscular bands to aid in the suctional process pass from the collar-like projection behind the head. I do not know whether this worm has been described. I have never found it in any great abundance, but it may be numerous in some localities.

The fourth worm (*Strongylus paradoxus*), in the lungs of the pig, needs but

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<sup>1</sup> To this Essay the prize of Thirty Pounds, offered by a Committee of Agriculturists in Cornwall, through the medium of the Bath and West of England Society, was awarded by LORD PORTMAN, the chosen adjudicator.

<sup>2</sup> These hooklets, or horny teeth, are probably always present, but the specimens I examined had been for some time in spirits, and, on this account, the hooklets might have escaped notice. This worm most resembles the *Strongylus hypostomus*, *Rudolphi*, the *Dochmius hypostomus* of Deising.

little description, as it much resembles the *Strongylus* in the sheep, first described ; but the females have a curved *spiculum* (point) at the tail.

The above description will serve to shorten my account of some of the dissections ; indeed, the morbid appearances are so similar in this form of lamb disease, that I scarcely need give them in more than one case. The blood is watery, the red corpuscles often scarcely amounting to one-fifth of their normal quantity ; the liver is white and soft, or softish ; the bile pale and thin ; the lining membrane of the alimentary tube soft, readily detached, and ecchymosed (that is livid) spots are not unfrequently seen. Sand or earth, too, in large quantities, is often found. On a recent occasion, I took three pounds of sand from the *cæcum* and other intestines, so that the latter were nearly blocked up with it. Some may suppose that it is eaten (for lambs have often been seen to eat it) for the purpose of ridding themselves of the worms ; but I imagine that the tendency arises rather from the vitiated state of the blood, as in the case of chlorotic girls.

As regards the worms in the last stomach, that play so important a part, as I believe, in draining the system of its nourishment, I have said before that I have sometimes found them in large quantities ; and many of my correspondents, who did not mention them in their first letters, have since informed me that they were present in great abundance. Mr Boby (p. 509) tells me that he has seen a teacupful taken from the last stomach. Mr Sexton (p. 508) speaks of their frequent presence. Mr T. Crisp (letter, p. 578) has seen a vast number of these stomach parasites, and he believes that "they are often the cause of death."

The parasites in the windpipe and lungs are sometimes very numerous ; the smaller tubes are crammed with them, and they exist generally in masses, some spots apparently being preferred to others. In the substance of the lung, too, the tubercle-like masses before spoken of, which exist chiefly at the lower parts of the lung, contain thousands of the young worms. If a little of the milky juice from these tubercles be put under the microscope, these worms will be seen in myriads, and in some of the biggest tubercle-like bodies, they will be found of larger size. The effect of these parasites, as might be supposed, is often to produce local inflammation of the lung, congestion of certain parts, especially of the lining membrane of the tubes, which are covered with a thick, whitish mucus, and sometimes with pus. This constant and unnatural secretion drains other parts of the system of their nutriment, robs the body of its heat and blood-corpuscles, and gives rise to the train of symptoms that follow, and end in death.

In many instances, however, the cause of death is not so clear, and the question, *Are the parasites the cause or consequence ?* is one sometimes difficult to answer (as mentioned in the cases at page 576), but I have devoted a separate chapter to this inquiry.

As regards the prevalence of this disease in old sheep, as well as in lambs, in many districts, there cannot be a doubt. I have recently examined about forty lungs of various sheep, most of them from a good butcher, and I find parasites in the proportion of about one in three ; sometimes they are not present in the windpipe or bronchial tubes, but the young are in the white masses before described. In recently examining eight sheep and lambs that were killed expressly for my inspection, in a district (the eastern part of Suffolk) where lamb disease is very prevalent, I found the two species of *Strongyli*, one in the lungs and the other in the intestinal canal, of all ; but not in sufficient quantities materially to affect the health of the animals. In a bull, an ox, and a fat pig, killed at the same time, I also discovered a few of the lung-parasites in each. There is one curious change that I have often found in the lungs in connection with these parasites, namely, their exclusion and destruction by the formation of a bony wall around them ; the fibrinous exudation is replaced by bony and cretaceous deposit, and the worms are found dead and of a dark colour.

Old sheep, too, that are thin, and never get into good condition, have not unfrequently their livers studded with the cysts of *Echinococci* (*Cysticercus tenuicollis*) in a state of cartilaginous and bony degeneration, so that the function of the organ is materially interfered with.



Another common lesion, in the lungs of young sheep especially, is a number of small, round, hard, shot-like semi-opaque bodies, about the size of a mustard-seed. These are seated upon the surface of the lung under the serous covering. They are composed of a semi-cartilaginous substance, which is quickly replaced by ossific deposit. I have failed to discover any distinct entozootic germs in them, but I am disposed to believe that they have a parasitic *origin*. The eggs and young of the *Strongyli* are sometimes in their characteristic cysts found among them, and they are more frequently seated at the lower part of the lung.

I will finish this chapter by selecting, from the many examinations I have made, the two following, which have a practical bearing on the question of treatment. A lamb about six months old, and a pig aged six weeks, were killed and sent to my residence on the same day, and by the same gentleman (Mr Crisp of Butley Abbey, Suffolk). The pig was in excellent condition; but it had a cough, was giddy, ran always on one side, and the owner was anxious to know the cause. I found a tumour on the brain to account for this latter symptom, but the air-tubes were crowded with *Strongyli*—indeed I scarcely ever saw them in greater abundance. The lamb was thin, and its blood and viscera were in the condition described above, but it had not half the quantity of parasites in its lungs that the pig had. The one animal was in a warm sty, and had its mother's milk, besides cow's milk and barley-meal. The other was deprived of its natural nourishment, and, when weaned, was not supplied with food sufficiently nutritious to prevent the changes in the blood and in the viscera that are so often the effect of these parasites.

#### 4. *Is the Disease the Cause or Consequence of Parasites in the Lungs?*

This is one of the most difficult and important matters to decide in connection with this inquiry. Although many assume that these worms are the cause of death—and that they are so in numerous cases scarcely admits of a doubt—yet there are a vast number of examples where parasites exist in the lungs and other parts, and where the exact cause of death is difficult to unravel. It must, however, be borne in mind, that an animal may succumb to the *effects* of these worms—namely, impoverished blood, softened and disintegrated liver, lesions of the lining membrane of the alimentary tube and other parts—and yet but few of the worms be found in the lungs or intestinal tube after death. As I have before stated, the greater part of these parasites are destined to remain in the lungs a certain time, and a lamb with a large number of them in July and August may have but very few in November and December; of this I have had many examples. I have examined lambs in July and August with a host of parasites in their lungs, whilst others from the same flock that were undoubtedly affected at the time mentioned, judging from the symptoms, were nearly free from them in November, although they had probably died from their *effects*.

The presence of these parasites, too, in calves, and of another species of *Strongylus* in the trachea of many young gallinaceous birds, where they undoubtedly occasion death, I think is strong confirmatory evidence that they are generally the cause of the mortality in lamb disease, although I admit that there are many cases of a very doubtful nature, and the matter cannot be satisfactorily settled until a great number of *well-conducted post-mortem examinations* are recorded.

The effect of some kinds of food, such as clover, where sheep have been fed before, or herbage of rapid growth from artificial manures, may have a deleterious effect upon the blood, and in this way occasion the train of morbid changes that are found after death. I could record, if the occasion were a fitting one, some curious cases of horses and oxen that have died, as I believe, from a rapid vitiation of the blood from feeding in certain localities, and there may be special influences affecting lambs, with which we are at present unacquainted. But, taking all circumstances into account, I am led to think that in the vast majority of cases of the so-called "lamb disease," parasites in the lungs, and often in the stomach, are the *cause* rather than the *consequence*; and, I repeat, it must always

be borne in mind that a lamb may die from the effects of these worms when the greater number of them have left the body.

5. *Experiments respecting the Transmission of these Parasites (Strongyli) to other Animals ; and on the Preservation and Vitality of their Eggs.*

In 1856 I gave several of these *Strongyli* from the lungs of a lamb to two kittens, which I had to kill, to see the result of another experiment ; after two months, several worms (*Ascarides*) but no *Strongyli* were found.

I have two tame ravens that have been constantly fed on lungs full of these *Strongyli*; but they exhibit no indications of the presence of parasites.

In October last I put some *Strongyli* into the trachea of a cock, and a few days afterwards I gave him a bladder-worm (*C. tenuicollis*) from the lungs of a sheep. In December he was very thin, his comb of a dull red colour, and I killed him. Nematoid worms were found in the *cæca* of the intestines, and the liver and spleen were much diseased ; but as the other experiment does not relate to the *Strongyli*, I need not give the result.

Into the tracheas of two hens I at the same time put *Strongyli* as in last experiment : one is now (December 28th) in excellent health, and lays daily ; the other has symptoms like the cock.<sup>1</sup>

To a rabbit six weeks old I gave *Strongyli* full of eggs from the lungs of a sheep ; in the early part of November last it improved in condition, and when killed at the end of December no entozoa of any kind were found.

At the same time I put some *Strongyli* into the trachæa of three toads, a frog, and a water-newt (*Triton cristatus*). On killing these six weeks afterwards, I found no trace of *Strongyli*.

I have tried various experiments upon the young worm and eggs, but the most important are not sufficiently matured to allow me to quote them. Some portions of lung containing the young were put under some grass in a flowerpot in a garden, in November and December ; and I found that some of the young worms moved after six weeks, and all were unaltered in appearance. They probably remain for some time in a sluggish and inactive state. The old worms, when taken from the body, can rarely be seen to move.

I have tried many experiments respecting the influence of various agents upon the young worms, and I have found that salt and water and sulphureous gas quickly destroy them.

6. *On the Origin, Effect, and Treatment of Worms in the Lungs of Lambs, and in other parts.*

All that we have learnt in this investigation leads to the belief that the so-called "lamb-disease," primary or secondary, is for the most part parasitic. The questions as to the origin of the entozoa, of alternate and of spontaneous generation, would be too long for this treatise ; but a few explanatory remarks may not be out of place.

A great proportion of the entozoa do not enter the body of animals in their adult state, but in a pupa or baby condition, when they often bear but little resemblance to their parent (for I am obliged to speak in the singular number, the generative organs being often in one and the same individual). They moreover undergo a kind of progressive elevation in the scale. Let us give a few examples :—

Of the three kinds of tapeworm (*Tænia*) that infest the body of man, the one most common in England (*T. solium*) is always occasioned by eating pork not properly cooked ; another and recently discovered species, the *T. mediocancellata*, from beef and veal ; and the third, the broad-worm (*B. latus*) is found only in those who have drank the waters of Russia, Switzerland, and Poland. Again, the

<sup>1</sup> The hen has since been killed, and I found, as in the cock, tubercles in the liver and spleen, but no *Strongyli* in any part. These birds had been kept in a damp confined space, and hence the tubercles.



flake (*Distoma hepaticum*), in the liver of sheep and other animals, passes the first stage of its life in the body of a water-snail or in the larva of some aquatic insect. The bladder-worm in the brains of sheep is only an early stage of tapeworm in the dog. Other forms of entozoa, too numerous to mention, pass the early part of their existence in the bodies of fishes, and are afterwards perfected in the birds that swallow them. The works of Van Beneden, Siebold, Küchenmeister, Nordmann, Blanchard, Leuckart, and others, fully explain these alternations; and I could add many of my own experiments and observations, but enough has been said to give the general reader an insight to this matter before investigating the origin of the *Strongylus filaria*, the parasite in the lungs of sheep.

In the worms above spoken of, the sexes are in the same individual, and the generative organs are not found in embryo worms; but in the *Strongyli*, all the species—the males and females—are separate, and the young worm (as in many insects) comes out of the egg at an indefinite period, according to the habitat in which it is placed. The eggs of some of the nematoid worms remain a long time before they are hatched. I have reason to believe, from experiments I have made, that the egg of the hair-tailed worm (*Oxyuris*), so common in man, and which produces excessive itching and annoyance when making its exit, remains many months, or years perhaps, in the manure and earth, and only vivifies under certain influences. But with the progressive development of the worm in question we have less difficulty; its origin and progress are readily made out in the lungs of the sheep. We see the ova, as before described, in various stages of development, and the young are not unfrequently extruded from the eggs when leaving the body of the mother. We find both in old and young sheep fibrinous masses in the lungs; and in these the bundles of young worms ready to find their way into the bronchial tubes, where they remain a certain time, and then make their exit from the body. In a recent visit to a sheepfold, I found several remains of these worms in the excrement of the affected lambs. The old worms die very soon after their removal from the body, but the young possess great tenacity of life. I have found them in putrid lung a long time after the death of the lamb.

But how do the lambs get these worms? The explanation, I think, is not a difficult one. Although a great many young worms are produced in the lungs, the greater number of eggs are excluded from the body in the froth and mucus from the nostrils, and in the excrement, more frequently in the months of August, September, and October. Nearly all these worms get rid of their eggs as soon as they leave the body; and, of all the wonderful sights revealed by the microscope, the emission of these ova from the body is the most marvellous. In some of them, the *Oxyuris* for example, before spoken of, a small white spot is first seen with the naked eye, about a third the length of the body from the head; on placing the worm under the microscope, the eggs are seen to be quickly expelled from the oviduct by a jerking, pulsatory movement; and in about two or three hours the oviduct is nearly emptied of its thousands of ova. I have seen the same process in the *Strongylus filaria*, but, of the many hundreds I have examined, this phenomenon has only been witnessed two or three times. There is one important difference in the eggs of the *Oxyuris* and those of the *Strongylus filaria*. Those of the former never contain young worms; when they leave the body they require time and the influence of certain agents for their development; but many of the young *Strongyli* are soon excluded from the egg—a fact of great importance in considering the method of transmission of the worms. I believe the above mode of expulsion has not before been described by any entozoologist. If the *Strongylus* is divided, the ova are seen to flow from the body in an uninterrupted stream; but there is then no jerking motion.

It can readily be conceived that, when a field has been fed on by sheep, these eggs and young worms may be taken in great abundance by the lambs; or that, if lambs are put upon a second growth of clover previously fed on by sheep, they would be likely to swallow a great number of the eggs and young worms. The general belief that old sheep have not these worms is erroneous, as I have

abundantly verified by dissection ; but they are not in such large quantities, and if they were, the old animal would be better able to resist their effects. The exact mode of development of these eggs, and the question whether they enter the mouth unbroken or in the shape of young worms, are matters of no great practical value ; they are most likely taken in both stages, and the young worms would readily ascend from the stomach during the process of rumination.

*The Effect of these Worms upon the System.*

As has been well described by many of the correspondents, the symptoms will of course be modified by the number of the worms and the condition of the lamb. A short, dry, husky cough, often discharge of frothy fluid from the nostrils ; loss of appetite, rapid wasting, bloodless eye, diarrhoea, staring of the coat, and sometimes loss of wool, excessive thirst, and frequently a desire to eat earth or sand (a symptom not mentioned by any of my correspondents). So great in some cases is the desire for water, that I have heard of several instances of lambs dying when in the act of drinking. The morbid appearances I have already described.

*Prevention and Treatment of the Lung and Stomach Parasites.*

So much practical information has been given under the head of prevention by most of the respondents, both in the west and east of England, that a very few words will suffice. The communications of the Baron Nathusius (page 581), and of Mr J. Hempson (page 577), are, I think, especially practical and instructive, and point clearly to the origin of the parasites. As mentioned by many correspondents, dry and warm situations, good food, keeping a proper proportion of lambs to the land, avoiding especially clover when in blossom or in seed, and fields of any kind that have been previously fed on by sheep, and changing from field to field as often as practicable, are the most important precautionary measures. These directions, though meant only to apply to the management of flocks that have been infected, are probably not inapplicable to the treatment of nearly all lambs after weaning.

Another question naturally presents itself, namely—What is the best means of purifying land infected with these parasites, so as to prevent future mischief ? I believe that ploughing and “pulling the land about” as much as possible, and manuring with salt when the nature of the soil will admit of it, will afford the most likely means to effect this object. Clean farming, too, is another important means of prevention.

As regards the effect of salt upon the eggs, especially those that are not in a forward state of development, I am unable to speak ; but judging from the difficulty of destroying the vitality of the ova in other nematoid worms, it is probable that it would have but little influence. But the deadly effect of salt upon the young worms is very apparent under the microscope. If when they are wriggling about with eel-like movements, a drop of solution of common salt is put upon the glass, they are quickly killed by it, and the same applies to spirits of turpentine and the smoke of sulphur. They keep alive for some time in weak spirit-and-water, when located in the fibrinous exudations in the lung before spoken of.

*Treatment.*

Before we prescribe for a malady in man or in any of the lower animals, it is important to know the nature of the disease ; and a good physician, like a good whist-player, should be able to give a reason for what he does. The ancients often prescribed a large number of drugs with a hope that one of them at least would hit the complaint, but unfortunately they seldom knew what the disease was ; and so I fear with some of our modern prescribers for cattle, who physic at a venture, and bleed “because all diseases of cattle are inflammatory !” I am



not speaking of the many able and intelligent veterinary surgeons that abound in this country (not so numerous as they should be), but of a host of pretenders, whose best school has been the village forge, and their lecture-room the village pot-house. A time will come—(when, it is difficult to say, for all changes in this country in connection with science are very gradual)—when all veterinary surgeons will be compelled by the Government, as in France, to pass an examination, and be registered as qualified practitioners of the veterinary art.

There are many clever people in the world who physic themselves and their families ; but my experience tells me that they had better send for a doctor, who may give them harmless physic when not absolutely necessary, but who may save life by prompt and early treatment. The same advice I presume to give to agriculturists respecting diseases of cattle. If an intelligent veterinary surgeon be within call, send for him early.<sup>1</sup>

In the treatment of worms, both in man and in the brute, if they are situated in the alimentary tube, we possess various anthelmintic medicines ; some of them act chemically by destroying the worm, some mechanically, by rendering its habitation unpleasant, and others by their purgative and expulsive action. Among vermifuges in common use are spirits of turpentine, male fern, scammony, gamboge, sulphur, tobacco, wormwood, quassia, cowhage, tin-filings, and powdered glass. Kousso and santonine are medicines of more recent introduction. I may mention one practical fact connected with the treatment of tapeworm (*T. solium*) in the human subject that bears especially upon the present inquiry. I have treated a given number of cases with turpentine, the oil of male fern, and kousso, and I am inclined to believe that turpentine is the most efficacious ; but in the great majority of cases, although many yards of the worm were expelled, the small head remained, and the patient was not cured. I now, after this treatment, order a teaspoonful of common salt every morning for a fortnight, and I believe with great benefit. I could give abundant testimony in favour of salt. Mungo Park, in his “African Travels,” speaks of its efficacy as an anthelmintic ; and Dr Daniel, in his work on the “Topography and Native Diseases of Western Africa,” 1850, says, “In the Bight of Benin intestinal worms are very common, but the introduction of European salt has diminished their number.” But what has the above to do with Lamb disease, “*in which parasites in the lungs are generally the cause or consequence?*” I have pointed out in several parts of this Essay that in the “Lamb disease,” worms in the stomach are often more prejudicial than those in the lungs ; so that in directing our treatment, it is often necessary so to shape our remedies that they may be destructive to parasites both in the digestive and respiratory tracts. Tapeworms (*T. ovina*) are also very common in the small intestines of lambs, as well as the hair-headed worm (*Trichocephalus affinis*) in the *cæcum*, and these, when combined with lung parasites, may lead to a fatal result. An animal might recover from them when in the lungs alone ; but when the nutritive process is likewise interfered with, death ensues.

Among the anthelmintics above mentioned for intestinal parasites, turpentine and salt I think likely to prove the most efficacious, and they may be used alternately with the undermentioned treatment for lung parasites. I may remark that in all cases they should be given in the morning after the lambs have been shut up during the night without food, the large mass of vegetable matter in the paunch otherwise rendering the effect of the medicine to a great extent nugatory. I believe also that the common wormwood (*Artemisia absinthium*), if chopped fine and given with dry food, such as oats, bran, pea-meal, &c., would, if the lambs

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<sup>1</sup> I trust that I may be pardoned this digression ; and if any should consider me a usurper in the veterinary domain, I may remind them that I have no pecuniary interest in the matter, but that, greatly to my own pecuniary disadvantage, I have been studying for many years the diseases of the lower animals and of plants, under the belief that in pathological as well as in physiological investigations, it is better to adopt the ascending scale and begin with the lowest form of organisation.—E. C.



could be induced to take it, be an excellent vermifuge for *Strongyli* and other worms in the stomach and intestines.

But how are our remedies to reach the parasites in the lungs? How are these pests to be driven out? Two<sup>1</sup> plans of treatment offer themselves. The first consists in the administration of a medicine, such as salt, sulphur, or turpentine, given long enough to pervade the whole system, and to affect the mucous secretions upon which these parasites feed.

I have had no experience as to the internal use of sulphur for lung parasites, but it is a harmless and cheap medicine, and has the advantage of not diminishing the power of the animal—an important consideration in some stages of the disease. A full teaspoonful of the milk of sulphur (*Sulphur præcipitatum*) might be mixed with the dry food, or given as a drench with milk, every morning fasting for a fortnight, and then at intervals of two or three days, watching its effect. The good done in this mode of treatment is by the *frequency* and long-continued and regular use of the medicine. If left to the discretion of shepherds, but few of them will carry out the directions *properly*. All should be done under the superintendence of an intelligent veterinary surgeon. Salt may be given in doses of a desert spoonful every other morning fasting; but to produce an effect upon the blood and upon the pulmonary parasites, it must be continued for a long time. For intestinal parasites the dose may be larger and less frequently administered, and the combination of turpentine, as recommended by Mr Trethewy (p. 506), may be more efficacious. As to the quantity of salt that a lamb will take with impunity, Mr Bobby tells me that his shepherd, who has given lambs salt, found that “they could not bear it every morning.”

Professor Simmonds (“Essay on the Rot in Sheep,” p. 151, before cited), in commenting upon the large quantity of salt recommended by Mascall, says, “We have known three ounces of salt dissolved in a pint of water, and given to a sheep after two days’ fasting, to produce immediate efforts to vomit, and speedy death.” In this instance the long fasting and the empty state of the stomach would have much effect, I think.

We now come to the treatment of the second and most difficult form of parasitic disease—namely, when the worms are located in the windpipe and air-tubes. As stated above, these can only be reached by an agent that acts gradually upon the blood and upon the secretions, or by applying a gas that will destroy them, or a part of them, at once; for I am not sure that the immediate destruction of all, if it could be accomplished, would be a safe practice. Sulphur, I think, in the form of gas, offers the best chance of effecting the desired object. Two correspondents (p. 505) recommend this method; one, in combination with tar and turpentine; the other, with tar and tobacco. I think sulphur alone would be preferable, for tobacco is always dangerous, and uncertain in its effects. The sulphur may be easily used, but it requires great caution to regulate the quantity and the time of exposure. Two or three lambs should be tried first in a building where air can be quickly admitted, if necessary. Common brimstone melted, and large pieces of deal dipped into it, so as to make large matches, will do very well, if burnt in an iron pot, or the brimstone may be ignited. The treatment must be under the direction of a veterinary surgeon, or some other intelligent person. It is not necessary that the building should be air-tight, but the animals must be sufficiently under the influence of the gas for about ten minutes, and even longer, if they will bear it. The treatment may be repeated two or three times weekly, according to circumstances.

Another gas, and one that is spoken of at page 576, is chlorine—easily obtained by pouring sulphuric acid (vitriol) on common salt. The death of the sixteen lambs, and the injury inflicted upon the man, should make us cautious in the use of these gases; but under proper superintendence, I believe that chlorine might be employed without danger; Mr Parnell, notwithstanding the loss of his lambs by the

<sup>1</sup> The one spoken of (p. 458), viz., the injection of salt and water into the windpipe, could not be generally practised, on account of the difficulty of the operation.



improper use of it (p. 576), reports favourably of it ; and Professor Bergelin, of Stockholm (p. 580), gives similar evidence.

One effect of these gases, probably, would be to move the worms from the smaller tubes into the larger *bronchi* and windpipe, where they would be more readily acted upon by the subsequent application of the gas.

#### 7. GENERAL SUMMARY.

The subjoined summary is from the evidence obtained by the Bath and West of England Society, from the answers to my letters and inquiries, and especially from my own observations and researches.

1. That the parasites (*Strongyli*) which form the main subject of this Essay, have existed in the sheep and ox for an indefinite period, but that in this country of late years they have greatly increased in the former-named animal, in consequence of over-stocking, and other causes already explained.

2. That the "Lamb disease" (so called) does not always depend upon the presence of parasites in the lungs, but that a vast number of parasites of another species of *Strongylus*, in the digestive stomach, and in other parts of the alimentary tube, by interfering with the nutritive and assimilative functions, are the chief cause of death.

3. That these worms in the lungs, often combined with *Strongyli* in the stomach, are for the most part the *cause*, and not the *consequence*, of the disease ; but that, like other parasites, their increase is probably more rapid in a depressed state of system, and under the influence of certain kinds of food.

4. That lambs not unfrequently die in tolerable condition, as I have several times verified, by dissection, without sufficient evidence of morbid change, and without the presence of parasites in sufficient number to account for death.

5. That an animal—lamb, calf, or young pig—may have a vast number of worms in the lungs and air-tubes, and yet be apparently in tolerable health, until exposed to cold, wet, bad diet, over-driving, or any other depressing cause.

6. That the baneful effect of these parasites is especially apparent when the lambs are weaned, and when their natural nutriment, the milk, is withheld.

7. That all *young* animals, including children, the carnivorous animals, rodents, pachyderms, ruminants, and some birds, suffer more from these and other parasites than those in an adult state.

8. That old sheep are also liable to these parasites in the lungs, but in these they are less numerous, and the power of resistance is greater.

9. That lambs in the last stage of the disease rarely if ever recover from its effects.

10. That the disease may be to a certain extent communicable from one lamb to another ; the frothy discharge from the nostrils often containing the embryo worms with the eggs.

11. That all breeds of sheep are equally liable to the disease.

12. That these parasites cannot, as supposed by many, be occasioned by any kind of food which does not contain the egg or the worm in its embryo state.

13. That no form of animal life can proceed from vegetable food unless the germ previously existed in such matter.

14. That in these worms there is no evidence of "alternate generation," as occurs in the fluke (*Distoma hepaticum*).

15. That all the information I have obtained tends to prove that the old and young worms, with the eggs, are passed with the excrement, and with the frothy fluid from the nostrils ; and that in this way the ground, in over-stocked fields especially, is studded with them.

16. That the greater number of these worms, like many other parasites, are destined to remain a certain time only in the system ; and that as winter approaches they exist in the lungs and alimentary tube in comparatively small numbers.

17. That turning lambs upon coarse grass early in the morning, when heavy

dew is upon it, is likely to favour the ingress of the parasites ; and that pastures or layers where sheep have been previously fed are *especially injurious*.

18. That the prevailing notion that clover is hurtful is probably a correct one, especially as regards the second growth, where sheep have been fed on the first—the lambs being more likely to obtain the eggs or embryo worms from this kind of food ; and that clover when in blossom and in seed probably has a deleterious effect.

19. That these parasites prevail most in wet seasons, when the germs and embryo worms are likely to be upon the herbage ; but many examples have been adduced of their occurrence in hot and dry seasons, where the feed has been short, and where the animals consequently crop close to the ground.

20. That the absence or presence of water has little or nothing to do with the prevalence of the worms.

21. That these parasites occur both in high and in low situations, and in drained or in undrained land, and on all kinds of soil, but that they probably abound most in wet and cold localities.

22. That they are not more prevalent in districts where rot (so called) prevails, but they exist to a great extent in many localities where the fluke is almost unknown.

23. That all depressing causes, such as dipping, shearing, cold, wet lying, low feeding, and over-driving, are likely to accelerate the disease, and lead to a fatal result.

24. That dry and warm situations, good and nutritious diet, such as oilcake, bean and pea meal, oats and bran, with free access to rock salt, are the best means of prevention.

25. That white turnips and rape or cole seed are especially beneficial, as shown by the testimony of several respondents, probably by favouring the passage of the parasites through the alimentary canal.

26. That in treating lambs medicinally for this disease, it is especially necessary to ascertain, by the careful examination of those that die, whether parasites (*Strongyli*) exist in the first stomach as well as in the lungs, and to regulate the treatment accordingly.

27. That where parasites are present in both localities, the alternate or combined use of turpentine, limesed oil, and common salt, are likely to afford the best chance of relief ; but that when the worms are confined chiefly to the windpipe and air-tubes, the guarded and gradual use of sulphurous and chlorine gases, under careful and proper superintendence, are the most likely agents to destroy the parasites, or to rid the lungs of them.

28. That *finely*-powdered sulphate of iron and ginger, well and properly mixed with pea or bean meal, are likely to prove a useful tonic when lambs are suffering from the anæmic (bloodless) condition produced by these worms.

29. That on all occasions in this and in other serious diseases of sheep and cattle, the agriculturist should call to his aid (when obtainable) an intelligent veterinary surgeon to superintend, regulate, or alter the treatment, according to his judgment.

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## PLEURO-PNEUMONIA IN CATTLE.

(Extracted from Professor Gamgee's Report, published with the Fifth Report of the Medical Officer of the Privy Council.)

It has been said by Delafond and others that pleuro-pneumonia is seen as a sporadic and enzootic disorder in the Pyrenees, Alps, Jura, and Vosges, and in the uplands of Hesse, Suabia, and Silesia.

It is certain that pleuro-pneumonia exists constantly in the Prussian dominions. It is very prevalent in Bavaria and other German states, but according to Röhl, not very common in the Austrian dominions.

There can be no doubt that, whatever may be the cause, there are districts, by



no means all mountainous, and I think, as a rule, rather the reverse, which may be regarded as settled "stations" of the disease. These "stations" are probably the seats of the disease from the constant traffic in cattle through them, and I mean by a station no more than a locality into which disease has been introduced and where it has been kept up by influences constantly favouring the attack of fresh animals. Many of these, either convalescent or actually diseased, carry the disorder beyond the limits of such "stations." In Britain all our large towns are stations for this disease. The weekly purchases in fowl markets lead to the uninterrupted prevalence of pleuro-pneumonia in many cowsheds, and from these diseased animals issue to contaminate the stock they come in contact with. In my travels I have found many cattle-dealers' farms which have been true "stations" for the spread of pleuro-pneumonia. Professor Gerlach says that it is most probable that pleuro-pneumonia was not originally a European disorder, but that the periodic outbreaks over the Continent during the last century have had apparently as their starting-points certain established stations, such as the districts noticed by Delafond.

#### PROOF AS TO THE CONTAGIOUS NATURE OF PLEURO-PNEUMONIA IN CATTLE.

Beyond these well-defined spots, which are rather widely scattered over the continent of Europe, but chiefly in its centre, the malady always spreads in the lines of communication established between distant parts by either war or trade. Thus in the eighteenth century the outbreaks of the disease (as also of the Russian cattle plague or steppe disease) were due almost entirely to the constant warfare in which the armies of every European nation were engaged. Pleuro-pneumonia owes its extension likewise to trade, and on this point I am in a position to furnish a large mass of substantial proof—firstly, from the general history of the disease and its geographical distribution at the present moment; secondly, from the history of separate invasions of counties, estates, parishes, and farms; thirdly, from facts relating to the constant prevalence of the disease in large towns; fourthly, from the results of experimental inquiries in Germany and France; and fifthly, from the results of my own experience as to the means which check the progress of the disorder. And besides this proof, I can appeal to all the best reputed literature of veterinary medicine.

First, I have to deal with that which is matter of fact in relation to the repeated manifestations of the disease on fresh soil, and the course which it has taken.<sup>1</sup>

The great point is to establish how the disease has passed from country to country so as to lead to the present frightful condition of herds on British soil.

<sup>1</sup> It is undoubted that during the last century revolutions and war led to constant outbreaks of contagious disorders, which more than decimated farm-stock; and pleuro-pneumonia was one of the diseases which especially attracted attention. It was worked earnestly at by many eminent men, including Haller. The immortal physiologist of Zurich says: <sup>1</sup>—"Above all, we must abandon all hope that the lung disease is not a contagious disease." . . . . . "At all events, it is certain that in our land, as often as the lung-plague has appeared amongst cattle, the origin of the disease has been *always* traced to the purchase of an animal from a suspected market, or to one brought from an infected district into our land. At other times our country people have fattened cattle with other cattle from infected parts."

Haller lived in Zurich. His observations apply to Switzerland generally, I suppose; and it is the decided terms in which so great an observer writes that first created doubts in my mind as to the spontaneous origin of the lung-disease, even in the mountains of central Europe, which have been so well defined by Delafond. I feel inclined to look further than Europe, and to hotter climates than those of Germany, France, and Switzerland, for the spontaneous development of the disease.

<sup>1</sup> Abhandlung von der Vichseuche.—Berne, 1773.

We need not go very far back. Towards the end of the eighteenth century, and beginning of the present one, the continent of Europe, the scene of perpetual strifes, continued to be overrun by the disease. In the days of Waterloo, the malady had penetrated France, Belgium, Hanover, and Holland. It was everywhere but in England and the extreme north of Europe. It even followed Napoleon into Russia. All this was due to the necessities of large armies. They required cattle both for their transports and for food.

A long peace, and the activity of many Continental governments in checking the spread of contagious disorders, led to the salvation of much stock. Pleuro-pneumonia receded to its usual haunts in Central Europe,—to Silesia, Prussia, Austria, and the Rhine provinces. Its outbreaks were very partial, and its form benignant. With peace and prosperity came the development of various industries, and perhaps the most important in relation to the spread of this cattle disorder was the establishment all over Germany, Belgium, and some parts of Holland, of distilleries, and of starch and sugar manufactories, &c., which have increased in importance and number up to the present day. The manufacturers soon found that their refuse must be eaten by stock, and the feeding of cattle on grains has since annually increased. Populations also annually increased, and the cattle trade became more active in consequence. Russian, Polish, and Hungarian dealers travelled large herds of cattle westwards. The invasion of a territory by pleuro-pneumonia is insidious. The disease commonly escapes observation as it steals into a farm or country, and is consequently perhaps more destructive than any other known epizootic disease.

Between 1824 and 1830 it raged here and there throughout Bavaria, Würtemberg, Austria, Prussia, and the Rhine provinces.

#### HOLLAND.

As we owe this disease unquestionably to our Dutch trade, it is interesting to notice its gradual progress towards our shores. It first appeared in Holland on the Prussian frontier six years later than its manifestation in Belgium. In 1835 the malady was transmitted from Guelderland to Utrecht. It reached South Holland immediately afterwards, and prevailed especially near the great cattle markets of Rotterdam and Schiedam. The islands of Zeeland then began to suffer at various parts wherever South Holland cattle were injudiciously imported, and some outbreaks were attributed to infected cattle from South Holland, North Brabant, and West Flanders. From importations of infected cattle, the lung-disease attacked the stock on a few farms scattered through the provinces of Drenthe, Groningen, and Overijssel.

It was as late as 1842 that we hear of the first appearance of the disease in Friesland, and its manifestation in the British Isles.

It must be particularly noticed that Friesland, where such havoc has been since committed, was free until the British ports were opened to foreign stock. In 1842 the northern provinces of the Netherlands began to be impregnated with pleuro-pneumonia. The first traces of pleuro-pneumonia were observed at Nejiga and at Wurms. The Dutch Government ordered the slaughter of all the infected cattle, and Friesland remained quite free until 1845. Then our trade with the north of Holland was increasing. Cattle was passing to Harlingen from Overijssel, and in the month of December 1845 the lung-disease appeared at St Nicolungsa, the following March at Mirus, and soon after at Enkhuysen.

Prevention by slaughtering diseased cattle was enforced, and the authorities in Overijssel were asked to adopt similar measures that there should be no renewed introduction of disease from that province. The cattle trade, however, was too active for this. No sooner was the disease extinguished in one spot than it appeared in many others.

In the last half of the year 1847 the disease broke out in 16 stables in 16 different districts. A last attempt was made to arrest the malady, and 703 sick or suspected animals were killed and buried. Larger and larger did the number



of infected stables become as the cattle-dealers' movements increased. In 1848, 58 different outbreaks occurred. By this time (1863) between 5000 and 6000 of the 14,000 stables in which cattle are kept in Friesland have been visited by the disease, and the annual mortality has risen from 5·25 per thousand in 1850 to nearly 40 per thousand at the present time.

Let us now turn to our own country.<sup>1</sup>

#### APPEARANCE IN THE BRITISH ISLES.

It has been asserted that pleuro-pneumonia appeared in this country before, though only very shortly before, our importations in 1842.<sup>2</sup> Undoubtedly it did appear before the *free* admission of foreign cattle into our ports, and singularly enough it appeared in a part of the United Kingdom most distant from contaminated countries, with which our free trade was first opened up, but very careful inquiries have convinced me that it was in county Cork, and indeed in the city of Cork or its vicinity, that the first outbreak occurred. In 1839, 1840, or 1841, animals were imported by gentlemen related to a British Consul at one of the Dutch ports; they were destined for breeding purposes, and at the present day traces of these early importations are to be seen in county Cork, where there are numerous crosses, with a decided admixture of Dutch blood.

Pleuro-pneumonia was introduced into county Limerick from Cork only in 1844. From Limerick it spread to Carlow, Kilkenny, Tipperary, Waterford, Wicklow, Meath, Galway, and Roscommon.

The losses in Ireland have been enormous, and indeed much larger than in England or Scotland. That this is a fact is proved by the difficulty insurance companies had in keeping any business together in that country. They were obliged repeatedly to relinquish the insurance of cattle to save themselves from early ruin. The north of Ireland has generally been more free from the disease than the south, but we find that in 1844 some cattle were imported into county Tyrone from Glasgow, and amongst these it broke out, continuing its destructive career until 1852, since which it has much abated. Londonderry suffered about 1849-50, and here and there in all the other counties, not excluding Kerry, the introduction of the disease by travelling or purchased cattle has occurred.

Whilst the lung-disease was thus lighting up in different parts of Ireland, it was committing great ravages in England. All the large towns containing dairy cows suffered. Speedily did the disease pass from London to Manchester, and Birmingham to Liverpool, Leeds, Sheffield, and Newcastle. It was in the month

<sup>1</sup> I have for a considerable time made it a special point to obtain accurate data as to the first appearance of pleuro-pneumonia amongst our cattle.

It was, as usual in other countries, preceded by the foot and mouth disease, and this depended on the fact that the maladies are communicated in the same way in the lines of communication established by trade; but epizootic aphtha is much more quickly communicated from animal to animal, and herd to herd, than any other contagious disorder we are acquainted with. Spanish oxen imported quite healthy, and exposed in the market at Islington for sale one Monday, are observed to suffer severely from the disease the following week. They come here quite healthy from a country where there is no such disease, and they are forthwith seized. Pleuro-pneumonia is not so rapid, and it is a matter of daily observation on farms and in dairies, that a new purchase communicates the foot and mouth disease, and six weeks later, shows signs of pleuro-pneumonia.

The foot and mouth disease did not precede the appearance of pleuro-pneumonia in America or our Australian colonies, inasmuch as any cattle embarked in Europe would have passed through the different stages of epizootic aphtha on board ship, but would probably show little signs of the lung-disease until after the sea voyage, when the period of incubation would have been completed.

<sup>2</sup> The same assertion has been made with regard to vesicular murrain, and requires the same correction as that which I have made in my text.

of November 1843 that English cattle carried the disease into Scotland. It speedily passed to Glasgow, Perth, and Aberdeen. In 1844 it reached Inverness by cattle taken there by sea. Thus the large towns and their vicinities were first affected, but no great interval elapsed before farms were contaminated. The counties of Norfolk, Lincolnshire, Derbyshire, Lancashire, Yorkshire, and Northumberland were all affected by 1844 and 1845. It was later that the disease entered the breeding districts of Gloucestershire, Herefordshire, and Devon. Cheshire lost early and much. In Scotland it was 1846 and 1847 before many districts in such counties as Lanarkshire and Ayrshire had the disease. It has committed great ravages in Wigtownshire, Renfrew, Fife, Perth, Kincardineshire, and Aberdeen. It has been rarely, and on few farms, in such counties as Argyll, Banff, Inverness, and Caithness. Into some of the Scotch Isles it has yet to enter.

#### ABSENCE OF RELIABLE STATISTICS ON THE SUBJECT.

The total absence of statistical information on this important subject is much to be deplored. It is certain that many districts are wrongly supposed to be healthy, farmers preserving the greatest secrecy as to losses, in order that they may still be able to dispose of cattle. Our large towns, with their thousands of fine dairy cattle, stand first on the list as to the prevalence of pleuro-pneumonia; next are the grazing and stall-feeding districts and counties; and the healthiest portions of England, Scotland, and Ireland are those where animals are bred. All this demonstrates that in proportion as purchases have to be made disease is rife. It is absent where there are no buyers, and where all are sellers.

In connection with the history of pleuro-pneumonia in Great Britain and Ireland, it is interesting to observe that whereas at first people thought they could get store cattle from Holland, they soon found that the losses were too heavy and English stock must be relied on. All who have bought Dutch cattle for dairy purposes, grazing, or stall-feeding, have had at one time or other serious cause to regret it. The temptation was great in consequence of the quality of the stock, but the risk too large. On this subject Mr Robert Herbert says<sup>1</sup> that experiments "made in fattening foreign beasts in this country, where successful, have turned out some extraordinary beasts; and had it not been for the heavy losses by disease, very large profits would have been realised by our graziers. We may give an instance of an experiment in Norfolk. An eminent grazier, residing in the country, purchased in the early part of last year (1858) 200 beasts in London at L.13 each. They were grazed upon strong land and afterwards stall-fed. After the lapse of five months, about 100 of them were again disposed of in the London market at L.25 each; but out of the number originally purchased, nearly 50 of them died, and the remainder produced no profit to the owner upon the original outlay." The Roxburghshire farmers can relate similar facts, and our dairymen can testify to the enormous danger of placing Dutch cattle amongst healthy stock.

#### PLEURO-PNEUMONIA IN SWEDEN AND IN DENMARK. OBSERVATIONS BY MR FENGER.

I must now devote some attention to the spread of disease from England to other countries, and from Europe to the opposite hemisphere. In 1847 English cattle communicated pleuro-pneumonia to Sweden, and in 1848 it spread from Sweden to Denmark. Mr R. Fenger, an extremely intelligent Danish veterinarian, writes me as follows:—"As to the appearance of this disease in the kingdom of Denmark, it is an established fact that it has taken place only three times upon three different farms where cattle had been introduced from abroad. No other cattle were affected than those in the three herds alluded to, and for three years no disease has appeared in Denmark. As to the spontaneous origin of

<sup>1</sup> Journal of Royal Agricultural Society of England, No. xlv., 1859.



pleuro-pneumonia, I wish to draw your attention to the fact that it is never seen in the town of Copenhagen, notwithstanding that in this place large dairies are kept where the cows are fed on draff from the distilleries, and are kept in a state very contrary to any which sanitary rules might suggest. In the dukedom of Schleswig the disease has been imported (last from England) several times, and occasionally has spread rather widely. This autumn the cattle of thirty different places in Schleswig have been kept in a kind of quarantine."

#### DISEASE IN OLDENBURG.

In 1858 an agricultural society in Oldenburg purchased some Ayrshire cattle to distribute amongst its members for breeding purposes. Wherever these animals went they communicated disease. Oldenburg has kept very free from pleuro-pneumonia from the activity with which the infected animals are destroyed on the outbreak of disease. The same remark applies to Mecklenburg Schwerin and Schleswig Holstein. With regard to the latter province, we find that in 1859 some Ayrshire cattle imported in the vicinity of Tondern communicated the pleuro-pneumonia.

#### SPREAD TO NORWAY FROM SCOTLAND.

In the month of August 1860 an agent sent by the Norwegian Government purchased a number of Ayrshire cattle; they were taken to the Royal Agricultural College at Aas, and in the commencement of November pleuro-pneumonia broke out amongst them. Dr Oluf Thesen has informed me that he limited the disease to the college by destroying the native cattle with which the Ayrshire stock had come in contact, and keeping the Ayrshire animals to themselves. Norway had been exempt from this cattle plague, and owing to Professor Thesen's activity now enjoys the same immunity.

#### COMMUNICATION OF THE DISEASE FROM ENGLAND TO AMERICA IN 1847.

In 1847 Mr Thomas Richardson of New Jersey imported some cattle from England. They soon showed signs of the disease, and Mr Richardson had his whole stock, amounting in value to 10,000 dollars, immediately destroyed. As early as 1850 a cow which was sold in Brooklyn, N.Y., and which had been taken over to America from England, manifested symptoms of pleuro-pneumonia; she was placed in a herd of forty, and they all died. The disease spread with great rapidity. On the 23d May 1858 Mr Winthrop W. Chenery of Belmont, six miles from Boston, imported four cows from Holland. One cow died as early as the 31st of May, the second on the 2d of June, and a third on the 30th of the same month, the fourth cow survived; but in the month of June Mr Chenery sold three Dutch calves to Mr Stoddart of North Brookfield. Thence the disease spread with great rapidity.

#### PLEURO-PNEUMONIA IMPORTED INTO AUSTRALIA FROM ENGLAND.

Within the last three years great ravages have been committed by pleuro-pneumonia in Australia. In the month of September 1858 a Mr Boodle, farmer, near Melbourne, imported a cow from England; she landed in good condition, and gave milk. She died of pleuro-pneumonia six weeks after her arrival. Two other head of cattle belonging to Mr Boodle died in December, and another in January. The disease continued to spread, and the losses have been enormous and incessant since in Victoria, and the disease has been communicated to New South Wales. Thus, when we trace the history of pleuro-pneumonia, its progress by contagion is proved. Wherever the first diseased animals have been slaughtered early, as in Denmark, Oldenburg, and in New Jersey, the disease has not spread; but where months have elapsed before measures have been adopted, the disease has insinuated itself into many parts of the country, and has proved most destructive.

## SEPARATE INVASIONS IN DISTRICTS, ETC.

2. The contagious nature of the lung-plague is also proved by the course which it takes in spreading, and by the singular exemption of breeding districts. The malady on making its appearance does not, as if it were due to atmospheric agencies, to changes of weather, &c., devastate the whole district. A farmer buys a cow, or a lot of cattle, in a public market; in six weeks or two months the symptoms of pleuro-pneumonia appear, but if there are no means of communication between the cattle of this and adjoining farms, all the latter remain free, while the entire stock of the former is destroyed. Cases of this description are of every-day occurrence, but I may be permitted to repeat some striking instances where farms that have had the lung-disease are, in many cases, encircled by farms that have escaped it.

First, I would refer to the experience of twenty-six farmers on one Perthshire estate, that of Lord Willoughby d'Eresby.<sup>1</sup>

Mr David Duncan, Mains of Cargill.—The farm has been tenanted by Mr Duncan's family for seventy years. Pleuro-pneumonia was never seen on it until this year (1862). Mr Duncan purchased a cow about the middle of December 1861. A month after she indicated the symptoms of lung-disease, and was placed under treatment. Two cows were seized a month after this, then other two and two two-year-olds, until sixteen cases occurred. Two were permitted to die, four recovered, and all the other sick animals were sent to Glasgow market. Mr Duncan disposed of his whole stock, that he might sustain no further loss than was entailed by such a procedure.

Mr James Mailler, Links.—Had the lung-disease twelve years ago, in consequence of purchasing a cow in the Perth market. Again, six years ago, he suffered from an attack in a very singular manner. He sent some fat stock to the Edinburgh market, for which he was offered an insufficient price, and took it home again. The cattle exposed in the market were seized with pleuro-pneumonia on their return. Since then Mr Mailler has avoided markets by rearing his own stock, and has sustained no more losses from contagious diseases. Mr Mailler has been on the Links farm for thirty years.

Mr William Scott, Balahomie.—Bought stock in a public market twelve years ago, and sustained serious losses by pleuro-pneumonia in consequence. Since then he has reared his own stock; but this season his cattle came in contact with some diseased animals at grass, and he has again been a serious sufferer.

Mr Jeffrey Greg, Brunty.—Three years ago Mr Greg let a grass park to an individual who turned some diseased animals into it. The field was only separated from an adjoining park by a hedge, and Mr Greg's lean stock having thus ready means of approach to the sick animals, was seized with the lung-disease, and the farm has never been quite cleared of it since.

Mr James Adam, Whiteby.—Nine years ago he purchased stock at a public sale, and suffered severely from pleuro-pneumonia in consequence. He has since reared his entire stock, and has sustained no further loss.

Mr John M'Intosh, Wellses.—The diseased stock of a neighbouring farm broke in amongst Mr M'Intosh's cattle four years ago. This led to an outbreak of pleuro-pneumonia, which lasted some months. Has been quite healthy since, as he breeds all his stock. Mr M'Intosh has been twenty years on this farm.

Mr George Croket, Newmill.—Had pleuro-pneumonia amongst his cattle seven years ago. He rears his own stock. Cannot account for the outbreak, except from the circumstance of the field in which his cattle were grazing at the time being at the side of the public road, along which diseased cattle are often driven.

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<sup>1</sup> For the interesting details given under this head, I am indebted to one of my students, Mr Robert Morton, Stobhall Mains, Perthshire, who was most diligent in prosecuting an inquiry which I deemed of great importance for this Report.



Mr John Bannerman, Parkhead.—Five years ago Mr Bannerman sent some of his stock to be grazed on a distant farm, and diseased cattle happened to be on the field. He sustained a heavy loss. He breeds, and has been nineteen years on his farm.

Mr James Irvine, Newbigging.—Mr Irvine breeds; but five years since his stock came in contact with some diseased animals that were driven on the public road, and the lung-disease soon manifested itself with all its virulence. Mr Irvine has been thirty years on his farm.

Mr William Henderson, Lestin.—Has been on his farm twelve years. He is constantly buying in the public markets. The lung-disease first broke out five years ago. Has continued more or less ever since.

Mr Alexander Rutherford, Campsie.—Had an outbreak of pleuro-pneumonia on his home-bred stock five years ago. He attributes it to contact with diseased cattle on the public road.

Mr Peter M'Gregor, Wolfhill.—Never had the disease. Breeds his own stock.

Mr James Marshall, Knowehead.—Ditto.

Mr John Howie, Moreside.—Ditto.

Mr David Cardean, Hatton.—Ditto.

Mr Alexander Ritchie, Whitefield.—Ditto.

Mr John Miller, Gallowhill.—Ditto.

Mr John M'Kenzie, Gallowhill.—Ditto.

Mr James M'Beath, Stobhall.—Ditto.

Mr Thomas Simpson, Whitefield.—Ditto.

Mr James M'Farlane, East Whitefield.—Ditto.

Mr Thomas Fullerton, Redstone.—Ditto.

Mr Thomas Thomson, Springfield.—Ditto.

Mr David Meal, New Mill.—Ditto.

Mr Peter Blair, Mid Whitefield.—Ditto.

Mr John Morton, Mains of Stobhall.—Ditto.

Another<sup>1</sup> illustration which I may adduce is that of the parish of St Martin's, in the county of Perth. Pleuro-pneumonia first appeared in the parish in 1845. Since then ten farms have been visited by the disease, and in every case the attack has been distinctly traced to contact with diseased cattle. Nineteen farms have enjoyed a perfect immunity, as they are all breeding farms, and purchases are very rarely made.

Again, a wide district around Abington and Crawfordjohn, in Lanarkshire, is entirely free from pleuro-pneumonia; and one of my most intelligent students, Mr David Menzies of Bellfield, wrote to me recently in the following terms:—"Pleuro-pneumonia is extinct in this district, and has been so for the last two years. It has only appeared in three or four instances, and in all was distinctly traced to contact with diseased animals. Our total immunity from it, as well as other infectious diseases, is due to the great care taken by farmers to prevent their introduction. Each stockowner does his utmost for his own interest, and the whole act together for the common good." It is a breeding district. If winds and wet and other general influences induced the outbreak of pleuro-pneumonia, how could it be that in the county of Lanark we have all the upland breeding districts healthy, while in and around Glasgow the mortality is always at the very highest point? or how could it be that in Renfrewshire districts which do not suffer are seen side by side with districts which suffer, perhaps, the highest loss yet recorded from pleuro-pneumonia? the Paisley district being constantly the seat of outbreaks, while districts around remain perfectly healthy.

I have purposely chosen the examples of counties, estates, entire parishes, extensive districts, and individual farms to indicate the singular features of the outbreaks of the lung-plague; and if it were deemed necessary, I could, in a

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<sup>1</sup> For the facts relating to the parish of St Martin's I am specially indebted to my student, Mr Patrick Mackenzie.

short time collect very accurate information to the same effect concerning many other parishes and estates. But from the facts adduced it is evident that home-bred stock, unless coming in contact with diseased stock, is not affected with pleuro-pneumonia ; that the disease disappears from the country, county, island, or farm if purchases are discontinued ; that the outbreaks on an estate occur on individual farms at irregular intervals, according to the times at which purchases are made or other contact with diseased stock occurs.<sup>1</sup>

#### FACTS RELATING TO THE PREVALENCE OF PLEURO-PNEUMONIA IN LARGE TOWNS.

3. The contagiousness of pleuro-pneumonia may be further illustrated by facts relating to its constant prevalence in large towns. I have usually considered that every third cow in a town dairy dies or is slaughtered because affected by the disease, and very often the severe attacks amount to 60 and 70 per cent. In the statistical chapter of this report very singular and alarming revelations appear concerning Edinburgh ; yet Edinburgh is certainly not worse than other large towns, as the stock purchased is excellent, and the cowsheds bear comparison with those of other cities. It is certain that bad ventilation, filth, changeable weather, or feeding on distillery wash, are incapable of producing pleuro-pneumonia. The cause of its origin and existence in town dairies was and is the purchase of infected cows. Cowfeeders must be constantly purchasing, and we find the disease kept in check by those who buy only from farmers whose stocks are healthy, and by those who keep cows in fields for two months before taking them into town, and thus satisfy themselves that the animals are not diseased. Our large city markets, teeming with infected cattle, are hotbeds for contagious disorders which destroy the best of our farm stock.

#### EXPERIMENTAL INQUIRY AS TO THE CONTAGIOUS NATURE OF PLEURO-PNEUMONIA.

4. To the same effect are the results of an experimental inquiry which was made in France by a scientific commission under the presidency of Magendie, and the report of which was published in 1854. The results were as follows :—That epizootic pleuro-pneumonia is susceptible of being transmitted by cohabitation from diseased to healthy animals ; that not all the healthy animals take the disease, but that some escape and others suffer slightly ; that of the affected animals some recover and others die ; that the affected animals, whether slightly or severely affected, are after recovery insusceptible of any second attack of the same disease.

As to the proportions in which exposed animals escape or contract the infection, and as to the proportions of death and recovery among the infected animals, the experiments were not numerous enough to justify general conclusions, and therefore, with reference to these questions, the commissioners simply stated the results of the experiments, viz., that of the exposed animals, per cent., 66 contracted the disease (45 severely, 21 slightly), while 34 remain unaffected ; and that among the affected animals the mortality was 17 per cent.

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<sup>1</sup> Dr Headlam Greenhow says, in referring to his inquiries as to the contagious nature of pleuro-pneumonia : " All my informants concurred in asserting that animals which have been recently purchased or removed are more liable to suffer from pulmonary murrain than such as have been some time in the sheds." This statement evidently indicates the connection of the disease with traffic. Thus, although pleuro-pneumonia has been in this country for twenty years, it first broke out on Lord Willoughby D'Eresby's estate about eighteen years ago. The exact date cannot be had, as the farmer who first suffered is dead. Some farms have escaped altogether. The outbreaks on others have been due to causes totally distinct in each case. Two occurred twelve years ago, one nine, another seven, another six, four five, one four, one three, and two this year (1862).



5. Equally conclusive as to the contagiousness of the disease are the results of my own experience as to the means which check its progress. I am frequently consulted as to the prevention of pleuro-pneumonia, and invariably act on the belief of the disease existing only as the result of contagion. Thus, I have been called to stocks where proper ventilation had been carried out, where the cattle had been kept in the most cleanly condition, where disinfectants had often been used, and in several instances old buildings been demolished to make place for new ones in the hope that these would prove healthier ; but I have found that those who have relied on such measures for the prevention of pleuro-pneumonia have met with disappointment.

In cases where the extent of stock has been small I have suggested that it should all be slaughtered, and that the purchase of new stock should be made in healthy districts. This, in all cases where it has been done, has put a stop to the disease.

A second plan I have adopted with farmers has been to recommend them to breed all their own stock, and to buy what they absolutely need from stocks known to be healthy. Persons who had lost heavily for many years in succession prior to following this advice, have since, for several years, remained quite free from disease.

Where it is impossible to carry out the plans above suggested, I have carefully examined the old stock, separated all doubtful cases, and supported the healthy with tonics and a liberal diet. This plan has succeeded admirably in my hands. But it must be remembered that for it to be effectual each examination must aim at detecting the disease in its earliest stage, and must therefore include very careful auscultation of the lungs.

On one or other of the above plans, I always succeed in putting a stop to the spread of pleuro-pneumonia ; and the principle of all the plans is to deal with the disease as contagious.

#### CORROBORATIVE QUOTATIONS FROM OTHER AUTHORS AS TO ITS CONTAGIOUSNESS.

6. The arguments which I have adduced in proof of the contagiousness of the disease rest not alone on my own observations, but on the best authenticated experience of other members of my profession. It is true that from the earliest times some veterinary surgeons have declared themselves non-contagionists, but their doctrine has not been, in my opinion, even plausibly supported by their facts. Some ascribe the disease to bad ventilation and filth ; but were our dairies and farms before 1842 better than they are at present ? Or is it bad ventilation that induces the disease in the hills ? Others attribute much to the east wind ; but has not the plague been rife in the most beautifully sheltered lowland pastures ? And had we not east winds before the 9th July 1842 ? Others, in professing to denote the causes of the disease, use that very general expression "epizootic influence," and rest satisfied with it as an explanation. Non-contagionists, few in number, assert, indeed, that it often appears where no purchases have been made ; that home-bred animals have died where purchased stock had remained healthy ; and generally that part of a stock enjoys immunity, while others fall sick with the disease. Now, wherever I have had a chance of inquiring closely into the cases when it has been said that no purchases have been made, I have usually found either that this statement has been incorrect, or else that farm-steadings and fields have been in the road side. In not a few instances I have ascertained that diseased cattle had been turned into pastures at night, or had travelled over the farm by day.

Again, as regards the alleged healthy state of stock communicating the disease, it has not been sufficiently remembered that an animal which eats, yields milk, and thrives, may be convalescent, and may have considerable latent disease ; perhaps even one lung adherent and in great part hepatized.

As to the exemption of part of an infected herd, this is fortunately the case with all the most fatal diseases ; but my previous quotations from the report of

the French commission on pleuro-pneumonia has shown that in this disease the escapes are much less numerous than non-contagionists have believed.

On the other hand, the advocates for the contagiousness of pleuro-pneumonia are very numerous. Some think, however, that the disease may *possibly*, under certain influences, originate spontaneously, even in Belgium, Holland, or the United Kingdom; while others (like Haller and Layard) make no such concessions to the non-contagionists, and some of these have been converts from non-contagionism.<sup>1</sup>

Delafond's work leaves no doubt on the subject. "Contagion," he says, "has particularly fixed my attention, and it has been for me the object of long and laborious researches. Admitted by some and rejected by others, it was of great importance for me to elucidate this question; it occupies, therefore, a great portion of my work. To convince my readers that the pleuro-pneumonia of cattle was really a disease communicated by mediate and immediate contact between healthy and diseased animals, whether in the stable or fields, in neighbouring pastures, or when condemned to breathe the emanations derived from cadaveric remnants, I have stated seventy-nine cases, including 505 transmissions of this disease. It has not sufficed that I should demonstrate by this mass of facts that pleuro-pneumonia should be classed amongst the contagious diseases; I have also wished to prove that the facts adduced against contagion by French and foreign veterinarians, whose talent and learning I much respect, were not accompanied by those circumstantial details which are required by persons who desire to be convinced on such a delicate and important question as the one under consideration.<sup>2</sup> . . . . It results from the information I have collected at Bray, and from that received from veterinary surgeons worthy of confidence, who practise in Picardy, Flanders, Pas de Calais, Pays de Caux, and in the environs of Paris, that as soon as pleuro-pneumonia enters a stable, the proprietors hasten to sell the animals, in consequence of the incurable nature of the malady. They sell, if fat enough, to the butcher, otherwise they dispose of the infected animals (*bêtes contagionnées*) which would have the disease later, to the merchants, who take them to fairs and markets. Now, what occurs from this perfidious sale? that the infected animals, and even sick ones, carry the disease into the stables of those who have bought them; so that if in the infected stable there are forty animals, for instance, and if ten of these, being sold, become ill in ten stables, the latter may all be infected and suffering; thus, the proprietors of the ten new foci of contagion (*foyers de contagion*) also sell their animals; from twenty-five to thirty stables are thus invaded by the disease. Thus, I can state pleuro-pneumonia spreads and multiplies its foci of contagion."

The careful perusal of Delafond's work, and especially of his *résumé*, indicates that he did not believe in the spontaneous development of the lung-plague in France.

Sauberg, the author of a most erudite prize essay on the present subject,<sup>3</sup>

<sup>1</sup> Professor Fuchs has published a long list of the advocates in favour of contagion, which includes Chabert, Tscheulin, Luppe, Sander, Ernst, Laurin, Kündig, Wirth, Frey, Vix, Gartellier, Toggia, Schneider, Niemann, Veith, Schrader, Prinz, Richner, Hering, Hertwig, Gerlach, Van Hertum, and many more. Not a few have been converts from non-contagionism. Wagenfeld says: "In a paper of mine which I published ten years ago, I expressed my opinion positively against the view that the lung-disease was contagious. Now, after making numerous new observations on the lung-plague, and subjecting the same to an unbiassed critical examination, I find myself constrained to admit that my earlier views were erroneous,—the lung-disease is very contagious." The same change of opinion occurred with Professor Spinola, of Berlin.

<sup>2</sup> *Traité sur la Maladie de Poitrine du Gros Bétail connue sous le nom de Péri-pneumonie Contagieuse*, par O. Delafond. Paris, 1844.

<sup>3</sup> "Die Lungenseuche des Rindviehes und ihre Geschichte besonders in Rhein preussen und Holland seit dem Jahre 1830."



speaks of pleuro-pneumonia as a peculiar contagious disease which only attacks cattle ; he cannot suppose that hurtful atmospheric influences would affect only cattle in a specific manner without inducing analogous diseases in men and amongst other domestic animals ; and he speaks of the non-contagionists' accusations against "atmospheric influences" as being mere cloaks for ignorance.

Professor Gerlach, now director of the Veterinary School at Hanover, who holds a high reputation as a man of great practical experience as well as learning, has made the subject of contagious diseases one of special study. He has found, as I have myself, that a conscientious investigation of any outbreak does not fail to determine in all cases that healthy stock has been contaminated by diseased animals. And it is in consequence of this that he expresses himself in the following peculiar terms :—"Diese meine eigenen Erfahrungen haben mir in verein mit den geschichtlichen Katatsachen eine solche sichere ueberzeugung gegeben, dasz ich nich nöthig habe, noch eine Hinterthür zum etwaigen Ruckzuge offen zu halten, und in dieser sichern ueberzeugung habe ich est stets für meine dringendste Pflicht gehalten den Glauben an selbstentwicklung durch rede und schrift zu bekämpfen, weit er der seuche vorschah giebt under dir wichtigste Hemmishuh ist dieselbe zu tilgen. Sund erst die staats behörden und Landwrithe allgemein von der wahrheit überzeugt worden dann hat die Lungenseuche ihre macht, ihre Gemeingefahr verloren, und dazu beizutragen, ist ein Hamptzweck, den ich bei diesem vortrage in Auge habe."

Mr Waters, whose prize essay on the subject of pleuro-pneumonia has attracted some attention, says, in his most recent publication :<sup>1</sup>—"A reference to our cases will, we think, satisfactorily show that it, the pleuro-pneumonia, is chiefly due to the introduction of drifted cattle to home stock. . . . The disorder is principally propagated by fairs and markets."

Dr Warneke of Kiel, in a paper translated by Dr Headlam Greenhow, says :—"It becomes every day more evident in this country that the pulmonary disease is not indigenous here ; that it has not developed itself spontaneously here, but that it owes its presence entirely to contagion arising from the importation of foreign cattle."

Mr Hansen, veterinary surgeon, in a report inclosed in Mr Vice-Consul Bird's dispatch from Hensborg, of April 6, 1857, and also published by Dr Greenhow, says :—"The lung-disease is contagious, *i. e.*, it developes a contagious principle ;" in Schleswig it can be "clearly shown by facts that the disease has always been introduced here from abroad, viâ Hamburg or Altona, and then propagated by occasional cases of infection. This is proved by its having first shown itself near Altona, and by its gradual extension towards the north, by its repeated suppressions [stringent regulations, and slaughtering the diseased animals.—J. G.] and subsequent reappearance from the same quarter ; and by its appearing principally in those districts where an active cattle trade exists."

The length to which I have extended this analysis of facts and opinions in order to demonstrate the real cause of the lung-plague of cattle in this country, precludes my saying much more on the subject, though many further observations and statements might have been included under each head.

I must, however, observe, that such men as Delafond, Sauberg, Spinola, Wagenfeld, Gerlach, and many more, have given evidence in their writings of a very careful study of the whole question, of laborious inquiries, and often of conviction against preconceived ideas.

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<sup>1</sup> Pleuro-pneumonia in Cattle ; its Natural Causes and Cure. By George Waters, 1860.

## ON THE PRESENCE OF A WORM IN CERTAIN TUBERCLES OF THE LIVER OF A RAT.

By M. COLIN.

Communicated to the Imperial and Central Society of Veterinary Medicine.

(From *Recueil de Médecine Vétérinaire* for July 1862.)

IN the liver of a rat killed at the Alfort Veterinary School, M. Colin found numerous yellowish points, varying in size from that of the head of a pin to that of a grain of hemp seed. They were scattered irregularly over the surface of the viscus, had little consistency, and, to the naked eye, appeared to be made up of numerous very fine granules. On microscopic examination, the greater number of the tubercles seemed made up of an amorphous matter, collected into spheroidal masses, which were applied one against another, and resembled somewhat the closed capsules of Peyer's patches. Several of the masses were covered by numerous ova, quite distinct, and disposed in sinuous lines. In three cases there was, besides the globular masses and ova, a very long and delicate cylindrical worm, regularly rolled upon itself, and surrounded by a lactescent material.

These ova have been noticed in the liver of the rabbit by Brown-Séguard and Küchenmeister, and in that of the rat by Rayer, but until now the worm has escaped notice.

The worm is white, cylindrical, very long, and rolled upon itself; it has a smooth integument and pointed extremities. These show it to belong to the genus *Trichostomum*. It closely resembles those found by M. Dujardin in the spleen of the schrew, and which he likens to a delicate tube filled with eggs. In this case, when compressed between plates of glass, the skin tears, giving exit to thousands of ova, with delicately granular vitelli.

In certain tumours the eggs had a delicate coat, and large granules resembling globules of fat;—these are the recently deposited. In others the eggs had two distinct membranes, separated by a clear zone, and the vitellus was either uniformly diffused or collected into a mass in the centre;—these are older deposits. The most recent tumours contained a worm filled with ova, but without any as yet deposited. Lastly, the oldest tumours contain neither worms nor ova, but have become hard and cretaceous.

M. Colin suggests that the *Trichostomum* exists primarily in the duodenum of the rat, whence it passes through the biliary ducts to gain the parenchyma of the liver, in which it deposits its eggs, and dies. The ova, when hatched, either die, as seen in the calcareous masses, or gain the intestinal canal of a dog, cat, or other carnivorous animal, which may have made the rat its prey, and are there transformed into the fully-developed entozoa.

## SUBCUTANEOUS TUMOURS IN THE DOG, DUE TO THE PRESENCE OF *STRONGYLUS GIGAS*.

By M. U. LEBLANC.

Communicated to the Imperial and Central Society of Veterinary Medicine.

(From *Recueil de Médecine Vétérinaire*, August 1862.)

NATURALISTS and veterinarians have frequently noticed the existence of *Strongylus gigas* in different viscera of man and animals, but always on the surface of mucous membranes. The pelvis of the kidney is the most common seat, and the organ is more or less atrophied, according to the size of the worm. In one case, M. Leblanc found that the merest trace only of the tissue of the gland was left, the worm being surrounded by a thin transparent envelope, evidently formed by the peritoneum and altered mucous membrane of the pelvis. In



the three following instances the worm was found in a hitherto unsuspected habitude—the areolar tissue, close to the urethra, between the ischiatic arc and the bone of the pelvis, either in front or behind the testicle :—

1st. In one case the dog was presented with a tumour in the perineal region, close to the scrotum. The owner said it had developed gradually, having been at first hot, painful, and hard, but afterwards indolent and soft. It had acquired the volume of the closed fist, and occupied one side of the perineum, seeming to be almost completely isolated from the penis. On examination, however, there was found, amidst the loose areolar tissue, a small indurated band, connecting the tumour with the posterior part of the penis. The tumour was hemispherical, had an irregular surface, and was surrounded by a very loose areolar tissue, so that it could be displaced with facility from the position it occupied. It seemed composed of a sac containing liquid, in which floated an irregular solid mass, quite distinct from the walls. The coats of the sac were thin at the summit, and increased in thickness toward the base. The presence of the solid body in the midst of the liquid led to the belief that blood had become effused into the areolar tissue, as a result of a violent contusion, and that the fibrinous parts of the blood had coagulated, so as to form a number of little irregular masses.

The puncture of the sac led at first to an escape of a small quantity of turbid serum, mixed with some pellicular debris, followed by a portion of a cylindrical, soft, reddish body, which, on extraction, proved to be a *Strongylus gigas*. It was of a pale-red colour throughout, except at its median part, where it had a cherry-red hue. The worm measured about 19 inches in length, and one-third of an inch in diameter at the median part of its body.

The dog recovered without further care.

2d. The second case occurred in a mastiff, which had frequently suffered from retention of urine. In the perineal region was a large tumour without heat or tenderness, having a somewhat irregular outline, and presenting all the characters of the tumour in the dog above-mentioned. This time the presence of a *Strongylus gigas* was at once diagnosed. The puncture of the tumour permitted the escape of a turbid liquid, as in the last case, and an entire *Strongylus* of considerable size. The dog recovered rapidly.

3d. In the third case the tumour existed in front of the scrotum, and on the left side of the penis. The subject, a mastiff of medium size, seemed in perfect health when first brought to Leblanc. Two days before the operation the owner had noticed the rapid development of the tumour in the place indicated, but no other symptoms of illness.

The tumour was indolent, and had a large base. The skin enveloping it was supple and non-adherent, save at the most prominent part of the tumour, which corresponded to a soft, fluctuating, rounded mass. The rest of the tumour was composed of masses of varying hardness. Toward the middle of the base, and close to the testicles, was a peduncle of the diameter of the little finger, and strongly adherent to the penis. This was continuous in the tumour with a nodulated central mass, more consistent than the rest of the structure.

On puncturing it a little turbid liquid escaped, followed by a beautiful living *Strongylus gigas*, of about 17 inches in length, and one-third of an inch in diameter at its middle part. It had a fine carmine red colour throughout its whole extent. It was a female, and contained ova.

Doubtless this dog would have recovered without further attention, as did the two former, but M. Leblanc determined to dissect out the tumour, in order to ascertain the peculiarities of the habitation in which the worm was found. This was done in the presence of Drs Désir and Rayer.

The tumour was in great part composed of indurated areolar tissue, of an equal consistency throughout, and having a whitish tint, with numerous red points. In the most prominent part—that most distant from the penis—was a sac of about an inch in diameter, communicating with two very long and sinuous canals, the walls of which, like those of the cavity, bore a great analogy to a pyogenic membrane. These constituted the nidus of the parasite.

There was no communication between the canals and the urethra, though this may have existed previously, as it is highly probable that the worm passed originally from the urinary tract into the adjacent areolar tissue. The pedicle connecting the tumour and the penis was in all likelihood the remnant of the indurated walls of the tube by which the *Strongylus* had passed. M. Leblanc was prevented from examining the mucous membrane of the urethra (as he could have wished, in order to decide this point), the dog having recovered, and being still alive.

The symptoms of such tumours are so marked, that they need not be mistaken for any other kind of enlargement existing in the same region.

M. Leblanc thinks that the areolar tissue cannot be looked on as a frequent habitat of this parasite, as they have only been found to inhabit it in this one situation, which is in the immediate vicinity of their normal haunt, the urinary tract. He thinks, moreover, from the great size of the parasites in the above cases, and the fact that they were always behind the bone of the penis, that they could not readily pass through the urethra in the groove of this bone, and accordingly made their way into the areolar tissue.

It would seem, too, that they had acquired their great development after passing through the ureters, otherwise these tubes were too small to permit their transit. In some cases, indeed, in which they had attained a great size in the pelvis of the kidney, they have passed out in a similar manner into the abdominal cavity. M. Plasse found in the abdominal cavity of a dog three large *Strongyli gigas*, which had entered it by bursting the envelope of the kidney. The proper tissue of the kidney had been completely absorbed, but within its capsule were found two other large *Strongyli*.

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## NOTES ON RABIES.

By M. RENAULT.

Communicated to the Academy of Sciences, Paris.

(From *Recueil de Médecine Vétérinaire*, September 1862.)

In this paper, M. Renault seeks to demonstrate why the rigorous measures adopted in France (taxation of dogs, and, latterly, muzzling of those allowed to run at liberty) have failed to reduce the number of cases of rabies. The result he attributes to the insufficient manner in which these rules have been carried out. The imposition of a tax has only very slightly diminished the number of dogs; and the muzzling is only rigorously insisted upon, at intervals, when the inhabitants of any particular town or district are violently excited, as a result of some rabid animal having been allowed at large and unmuzzled. Side by side with the results of the lax measures of France, he places those of the more stringent preventive measures adopted in Prussia, in order to show that the malady might be checked if proper measures were adopted.

The statistics of the veterinary school at Berlin show the following number of cases to have entered the school in the nine years immediately preceding 1854, when a general muzzling was enjoined:—

In 1845,	.	.	.	.	.	32 cases of rabies.
1846,	.	.	.	.	.	17     "
1847,	.	.	.	.	.	3     "
1848,	.	.	.	.	.	17     "
1849,	.	.	.	.	.	30     "
1850,	.	.	.	.	.	19     "
1851,	.	.	.	.	.	10     "
1852,	.	.	.	.	.	68     "
1853,	.	.	.	.	.	82     "

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In all,           278



In 1854 the police were enjoined to enforce the enactment that all dogs should be muzzled ; and the following were the results in the eight succeeding years :— This table, it should be understood, is not made up from the statistics of the school alone, but includes also all cases in the town which came under the cognisance of the police.

In 1854,	.	.	.	.	.	.	4 cases. <sup>1</sup>
1855,	.	.	.	.	.	.	1 case.
1856,	.	.	.	.	.	.	1 „
1857,	}	.	.	.	.	.	0 „
1858,							
1859,							
1860,							
1861,							

M. Renault concludes :—

1st. That the spontaneous origin of *rabies* is extremely rare.

2d. That the general and permanent muzzling of dogs is an efficacious method of preventing its propagation.

3d. That it is a mistake to suppose, as several authors have done, that the constraint of the muzzle is a cause of the development of rabies.

## THE ALLEGED CASE OF POISONING FROM EATING DISEASED MEAT.

(From the Banffshire Journal, August 29, 1863.)

IN reading your agricultural report in your journal of Tuesday the 25th August, I am sorry to see that such gentlemen as Dr Simon and Dr Keith should have been imposed upon and given to the public so erroneous a version of the very distressing circumstances which occurred at Mr Gerrard's farm at Foulerton, in the parish of Kintore, Aberdeenshire, in the month of November 1840. I hereby give my testimony as to the real truth of that fearful case as it came under my observation at the time.

I was then druggist, and, for want of a better, was the only acting farrier in the place at the time. Mr Gerrard called upon me on a Saturday evening, stating that he had another cow unwell, but did not think her dangerous, and that she had the same symptoms as the other two I had been lately attending ; and, as it was a very rainy night, he did not want to take me out, only to give him a little medicine home with him, and, as the case was not urgent, to call at my convenience. When I called next morning (Sunday) the cow was dead. I wanted to see her, as they had dressed her, and she was hung up in the cart-shed by the fore and hind legs, there not being height to hang her up in the usual way. I asked Mrs Gerrard, jun., if the cow had got any medicine of any kind, when she answered none whatsoever, and that she was dead almost on the arrival of Mr Gerrard last night after he left me. I wanted to see the inside, which I was shown, when I found nothing there to remark upon.

I then went to the carcase, and found it hanging as I have described, covered almost over with black spots, and some of very large dimensions. Mrs Gerrard asked me if they could sell her for beef, as the people that skinned her could see nothing about her, and that she was sure the cow was in high condition. I told her, in presence of all parties concerned, that it was of no use to offer any part of her for sale, that she would not be dog's meat, that she was full of mortification, and fit for nothing but the grave ; and at the time I cut out a number of small and large pieces from almost every part of her, showing to them how far the mortification had gone on. All were satisfied, and said they should put the carcass

<sup>1</sup> The first months of the year had elapsed before the measure was put in force.

out of the way to-morrow morning, that being Sunday, which I never had any doubt but was done.

I had occasion to call at Foulerton in a few days after, when Mrs Gerrard asked me to look in upon grandmother, as she called her, who resided in another house with a daughter by themselves. The old woman showed me her arm. She said she thought she had hurt it "rugging and tugging about the cow when she died." I at once observed erysipelas, and that of the worst kind, and advised them seriously to lose no time in getting proper medical advice, as the case might prove very serious. I observed that her daughter was looking very ill, and asked what was the matter with her, when she said it was just an ill cold she had got rising up and down with her mother during the night. I advised them both to take care of themselves, and see to get proper treatment, as her mother's arm might prove serious. At the same time the daughter mentioned to me that she felt pain about the shoulder, but she thought it would wear off with the cold.

Neither they nor I even mentioned about the cow, and I had no suspicion of any evil arising therefrom, until another day that I met by chance in Kintore Alex. Andrew, the blacksmith who had helped to skin and hang up the cow, when he told me he had been calling upon Dr Rainy, and that he had a small cut on the thumb that was like to give him trouble. He stepped into the shop and showed me his thumb, when I ordered him directly to shut it up and go back and find Dr Rainy, or some one that could treat it properly, or he was sure to be a dead man, for he was certainly smitten by the cow at Foulerton, and mortification was in his thumb as sure as it was in her. I was then even a little alarmed about myself, as I had cut and slashed about the cow, showing the people the extent of the mortification, and had my hands all covered with matter, but fortunately had no scratches, and soon washed thereafter. Andrew went home about a mile and a-half distant, and met a very kind and obliging neighbour. Telling him what I had said about his thumb, he was advised directly to go to the hospital in Aberdeen, when this neighbour (Mr Sangster) pressed him, and said he would take him to Aberdeen with his gig. When preparations were making for his going, one of the women died at Foulerton. It may be judged what was now the alarm of Andrew. He needed no further pressing, but was off to Aberdeen with all speed. When the other man, James Robertson, who lived at a neighbouring farm, likewise knew he had got a scratch on the arm while helping and lifting about the cow, he took coach that same night for Aberdeen, and, under the very eminent Dr Keith, they were saved. The other woman died next day. Judge the alarm that was about the place and the exaggerated reports, and of ignorant parties that did not know or inquire into the real nature of the case, and who believed that it was by eating of the beef; for it was told even to myself, who knew better, that swine, dogs, cats, and every living thing about Foulerton was dead or dying.

It was a most alarming case, and a very melancholy end of the two women. And from what I saw I never had the least doubts but it was by *inoculation* that the great evil arose, and *not* by eating; and that both the women had been inoculated by scratches from the bones sticking out while helping to lift the cow. Of course, I am no advocate for eating diseased beef, and may be permitted to ask how flesh and fowls are kept until sometimes in a putrid state and eaten with no bad effect? Game, for instance, is not reputed fit for using until the bird falls by its own weight when hung by the feathers.

I have no hesitation in saying that the account received by Dr Simon and Dr Keith, and given in their report when published, is wrong, and the public should be made aware of that very serious and extraordinary case in its true light. If the doctors want further evidence, or doubt this my brief report, let them inquire, and I will furnish them with living testimony to the facts, and let them and the public judge whether it be from eating or inoculation that the danger arises in using putrid or diseased beef.—Yours, &c.

A. WATT.



## PLEURO-PNEUMONIA IN CATTLE—ITS PREVENTION.

(From the *Scottish Farmer and Horticulturist*, September 16, 1863.)

So long as the lung-disease continues to kill a larger number of cattle in this country than all other diseases put together, it must be regarded as one of the most important subjects to discuss. There are doubtless those amongst our readers who will exclaim on reading this—Is it a fact that pleuro-pneumonia is now so prevalent? Some people say it is on the decline—it is dying out. And so it is in some districts, but only for a time; as other districts that have been free for a year or two are now experiencing losses which, in the course of a few months, will have to be borne by the farmers whose stock may be healthy now. If we cast a glance over the annual report on the health of stock, recently issued from the New Veterinary College, we find that a large number of veterinary surgeons allude to the great prevalence of pleuro-pneumonia, whereas a few speak of its attacks being milder and more partial than for the past. It is somewhat strange to find several veterinarians residing in the same county report very differently as to the prevalence of the lung disease. This indicates how much its outbreaks are localised, and the parish which imports the disease at one time is free at another. There has been much said of late as to the prevalence of pleuro-pneumonia in town dairies; and whereas we have drawn attention to its fatality in Edinburgh, the medical officers of health are calling out in the columns of the *Lancet* for the encouragement of preventive measures. We have never seen the disease in a more severe form than this year, and to the same effect are reports from the south.

What we wish again to allude to in a very special manner is the injury which farmers inflict on themselves by a secrecy that tends to check the adoption of proper measures for the prevention of the disease. Indeed, in order to keep the secret, they have recourse to stratagems, which only result in the further spread of the disease. During the past fortnight we have had several opportunities of noticing this. We shall give an instance in proof. A farmer called at the New Veterinary College last week to ask what could be done to an animal affected with pleuro-pneumonia. It was one of a large herd of bullocks. The animal was to be cured *at once*, or it would be sold; and when it was suggested that there was a certainty in the efficacy of measures which might be adopted to stop the further spread of the disease, the remark made was, “if any more become affected, they shall all be sent to market without delay.” This is what a great number of farmers would do; and in ignorance of the value of preventive measures, and of the consequences of selling an infected herd, the measure might be judged a prudent one. It comes to be an important question how so common a practice now-a-days may be checked. There are the advocates for the strong arm of the law, but we believe that in the long run the most effectual means will be the demonstration that pleuro-pneumonia is a preventible disease, and that the farmer will profit most by doing unto his neighbour as he would be done by.

The disadvantages of the sale of an infected herd are great. In the first place, as animals are seized one after another they are sent off to the butcher at a serious loss. The first case should be a warning to adopt means to prevent, if possible, the occurrence of a second case; but, as a rule, the second is waited for, and then the third, and so on, and all the animals are soon seen more or less to fail. They are then hurried to market, and an abundance of grass or turnips allowed to waste. Perhaps more cattle must be bought in to eat up the food, and then they are seized, and disease continues on the farm from month to month and year to year. Some farmers we have known to sell all their cattle, and feed sheep for a season; but this completely upsets arrangements, and serious loss is incurred. Under the most favourable circumstances, the “selling-out system” is usually attended with serious loss. Thus, for instance, we can point to several herds of bullocks at the

present moment that could be kept on so as to pay the farmer well for another month or six weeks, but which are to be sold at once, as some have shown signs of the disease. The farmer argues that to keep these animals on until they are more diseased will be a more serious loss than sacrificing grass which is in good condition still, and which must be lost if not eaten by the herd alluded to. Not only is much grass lost, but the manure as well, and several scores of pounds that might have been in the farmer's pocket never can get there.

As a choice of evils, the "selling-out system" may have to be adopted ; but we can safely say that, in every instance in which we have advocated other measures during the last eighteen months, the farmer has seen that he has saved money. Every rule has its exception, and we have advised the selling of a small healthy remnant of an infected herd to a butcher, so as to place a farm in the best possible condition for fresh stock. This has, however, been rare.

The activity manifested in London by the Medical Officers of Health in causing all cow-sheds to be registered, and only permitting those fit for the proper maintenance of animals, was looked upon at first as likely to lead to the arrest of the lung-disease in the London dairies. Those who had faith in this were, of course, the persons who viewed the disease as caused by foul air, improper feeding, and filthy water. They had the sheds ventilated, paved, whitewashed four times a-year, and saw to ample provision for the supply of water, and for the removal of manure, &c. There is no large city in the world where the cows have been so much looked after, and where the cow-sheds are such models of propriety as in London. It was otherwise a few years back, when, as in Edinburgh at the present day, cowfeeders are permitted to use their own discretion in all such matters ; but the disease—the contagious pleuro-pneumonia which raged in the days of filthy London dairies—rages now just as much as smallpox would prevail chiefly in the palaces of the upper ten thousand if the people therein were not vaccinated. Just as cleanliness, ventilation, &c., cannot preserve unvaccinated people from smallpox, so the same measures are utterly useless in so far as the lung-disease in cattle is concerned. This is now recognised, and attention is drawn to the subject in the columns of the *Lancet*.

Is it then, or is it not, possible to arrest the progress of pleuro-pneumonia ? Prolonged experience in dealing with outbreaks of this disease has shown us that it is as manageable as any other malady, and far more manageable than other epizootic diseases. There are those that still cry out that professional men are of no use when the disease appears ; but this statement cannot and does not apply to all. In many parts on the Continent the disease has been extirpated, and here we can as a rule clear a farm of it at once, and preserve the stock on the farm in health, without having recourse to the dangerous and costly process of selling to buy again. Though the rules to follow are simple and few, we have observed that in each special outbreak attention has to be called to apparently trifling but important circumstances, which the non-professional man would altogether overlook. It is, indeed, only by direct demonstration that farmers can be made to follow advice, and take definite precautions. We have tried the plan of advising farmers to carry out certain measures themselves, but they soon forget some important matter, and the disease spreads with redoubled severity. We therefore think that the attention of professional men should be more directed to the subject ; and if we may give one word of advice to the Medical Officers of Health in London ; it is that they should rely on advice from qualified veterinarians in advising the adoption of preventive measures for pleuro-pneumonia amongst the town-dairy cows.



## CURE OF PLEURO-PNEUMONIA.

(From the *Daily Southern Cross*, New Zealand, May 21, 1863).

THE following letter from Alexander Bruce, Esq., to the Honourable Minister for Lands, New South Wales, has been handed to us for publication :—

“Ten Mile Creek, 14th March 1863.

“Sir,—Referring to the report dated 21st January last, which I had the honour to forward to you, proposing a cure for the excessive swellings and indurated gatherings which not unfrequently follow the inoculation of cattle for pleuro-pneumonia, I have now to state the result of some additional experiments lately made by me for the purpose of testing the accuracy of the conclusions arrived at, and the efficacy of the treatment recommended in that report, and to inform you that on both these points the result of my later experiments entirely correspond with those already reported by me.

“Thus, on the 6th and 7th January last, nine hundred and fifty head of weaners were inoculated in this neighbourhood in what is now found to be an expeditious, safe, and efficacious manner, namely, by shedding the hair on the tail, near the tip, making a longitudinal incision in the lower part thus laid bare with a pen-knife just through the skin, and putting in this incision a drop of virus, which the operator rubbed well into the wound with the back of his knife. Out of this lot of cattle, in the course of from ten to thirty days, symptoms of a more or less dangerous character appeared on thirty-five head, which is now considered a large percentage of dangerous cases, and was in this instance accounted for through the incisions in the tail having, in many cases, been made too deep.

“When inoculated it had been arranged that the cattle should be carefully watched by the men tailing them, and brought to me on the very first appearance of swelling at the root of the tail or in the hind quarters. But the men at first neglected to attend to this until twenty head had indurated swellings, ranging from the size of an egg to gatherings of at least six times that extent, but in all sorts of shapes and forms, and in different parts of the hind quarters, although their seat in most cases was at the root of the tail and upwards for about two or three inches along the *sacrum* (the end of the backbone), with a tendency to spread after induration in a downward direction towards the inside of the hips.

“To the more advanced cases I used the knife, and where the swelling was not so very extensive, I cut out the indurated mass as completely as possible, and afterwards dressed the wound with a preparation of equal parts of Venice turpentine and buttyr of antimony, which in the course of a fortnight effected a cure. Where, however, the swelling had spread to a considerable extent over the hind quarters, and to have cut away all the indurated portion at once would have made a larger and more exposed wound than appeared safe, I at first cut away only as much of the indurated gathering as was necessary to remove the pressure from the passages which it threatened to block up, and afterwards, by applying the dressing mentioned, and by cutting away the unsound portion bit by bit, with the assistance also of the maggots (which I allowed to work in the unsound portions only, by applying a dressing they disliked to the sound), I gradually removed the whole of the indurated substance, and left a healthy wound, which soon healed up. In this way six head out of the twenty recovered, although ten of them were dangerously affected, and four head died, which was a less loss than was expected, considering the state of the ten head when brought in to be treated.

“With regard, again, to the fifteen cases in which the swelling was recent when first treated, and comparatively small and soft, instead of employing setons, as recommended in last report, I made an incision with a knife, the blade of which was fully an inch in width, right through the centre and to the back of the swelling, with the mouth tending downwards to encourage the discharge, and in the incision thus made I inserted a pledget of tow, well smeared with Venice turpentine and buttyr of antimony, and this renewed two, three, or perhaps four times,

at intervals of two and three days, brought on a discharge, and shortly after effected a cure. It is worthy of notice that, in several instances, on changing the tow for the third or fourth time, the pointer brought out a shell of indurated matter, in which the tow was imbedded, leaving the wound clean and healthy, and in these cases it seemed as if the unsound substance in the swelling had gradually hardened, and been detached from the sound by means of the dressing, till it came away in the manner described.

"This mode of treating the more recent and softer gatherings was found to be much more efficacious, as well as more easily performed, than inserting setons. For setons were more troublesome, carried, and kept, far less dressing in the wound, and were liable, from the nature of the applications used, to rot and drop out when the wound closed up.

"That every beast out of these fifteen head, with the slighter and softer gatherings, would have died if it had not been treated in this way, or even been dangerously affected, is not to be presumed; for although cases of swelling, whether ending fatally or otherwise, all commence and progress for a short time in the same manner, yet a good many cattle, when the swellings never go beyond the softer or first stage, recover without any treatment whatever, so soon as the gatherings suppurate and break. On the other hand, again, it is to be remarked, with regard to the efficacy of the treatment of this milder class of cases, that none of the cattle were afterwards fatally or even dangerously affected, which some of them must otherwise have been. In a few cases indurated gatherings to a small extent certainly did take place near the seat of, and always under the softer swelling; but by carrying the discharge from the tow (which, of course, contained a considerable quantity of dressing), by means of an incision through the centre of the slightly indurated gatherings, they were easily kept under and removed.

"It is almost always the case when there is any swelling whatever at the root of the tail or in the hind quarters, that the tail itself, for a considerable portion of its length from its butt downwards, is more or less swollen and inflamed. To relieve this, I would not now recommend that any portion of the tail should be cut off, as that has been frequently tried, and always with bad effect, at any rate, when taken off near the hind quarters; careful bleeding, however, by cutting longitudinally, and not too deeply along the tail (not across it) at a short distance from the root, relieves the animal, and should be practised in all such cases.

"If any attempt is to be made to save stock from the bad effects that sometimes follow inoculation, everything goes to show that too much care and watchfulness cannot be exercised to catch the swelling at its earliest discernible stage, and to treat it at once. Were this done, and supposing that the inoculation had been carefully performed with the proper virus, the deaths from the operation need never exceed one per cent. In the case now spoken of, it will be seen that the losses in this way were only about one-half of that percentage.

"In these experiments dressings of cantharides and of chloride of zinc were tried as escharotics, but the buttyr of antimony was found to be better than the cantharides, and as efficacious as the chloride of zinc.—I have, &c.

(Signed) "ALEX. BRUCE, *Inspector of Cattle.*"

## ANTHRACOID ANGINA DEVELOPED AFTER DRINKING ICY WATER.

By M. REBOUL, senior Veterinarian at Coursan.

(From *Recueil de Médecine Vétérinaire*, December 1862.)

THIS case occurred in the stables of a certain Madame Riols, who bred a number of horses. The stables were at some distance from Narbonne, in the midst of a marshy plain, a certain pond of which usually supplied water for the horses. On the 7th February the frost was intense, and the waters were all



covered by a thick layer of ice. The ice was broken with some difficulty, and the horses watered at their usual place. This was at 8 A.M. As soon as they had returned to the stable, a fine mare had violent shiverings, and in a short time the greater part of the stud of twenty-six horses were similarly affected. The exceptions consisted of five or six foals which had not approached the water, and some horses that had drank less than the mares.

Active hand-rubbing and fumigations seemed to put a stop to the rigors, and at 11 A.M. the animals partook of their ration of hay with their usual relish. Several mares in foal, however, showed slight tremblings at distant intervals.

At 4 P.M. some of the mares had swelling of the throat, but it was not until 9 P.M., when the swelling of the throat in five mares was such as to threaten asphyxia, that M. Reboul was called in. Two hours later he arrived, and diagnosed an anthracoid affection so violent in the case of nine mares, that he did not hesitate to predict their speedy death.

In the worst, the swelling of the head, throat, and neck was such, that the whole presented a great unshapely mass. One soon died from asphyxia, and before 10 A.M. of the day following eight others had succumbed. One more died soon after.

The three remaining mares were treated by means of frictions on various parts of the body, with tincture of cantharides for scarification of the tumour, and the administration of astringents, tonics, and antiseptics, but all proved of no avail. One died at 6 o'clock the same evening, the second at midnight, and the third the following day at 10 A.M.

The symptoms varied somewhat in different cases. Some subjects were very prostrate, and supported the head in the manger, while in others there is great excitement. The rigors occurred at long intervals, the skin dry, and the coat staring. The swelling of the throat commonly increased slowly, or even remained stationary for a time, whilst in other cases it augmented rapidly, and produced asphyxia in the course of six hours. In the early stages of the malady the pulse was commonly very frequent and a little hard; the respiration, though a little thick, was little accelerated, and the appetite was yet good.

The swelling always commenced about the throat, and in five cases confined itself to this point, whilst in six others tumours of more or less considerable size were developed at the entrance of the chest, in the axilla, and on the upper part of the neck. In the *post-mortem* examinations it was found that those in which the external tumours were few and small had more numerous lesions in the great splanchnic cavities, and especially in the abdomen.

The tumours were sometimes soft, crepitating, and scarcely painful, presenting the ordinary characters of œdema, and extending slowly. In other cases they were acutely sensitive, covered by bristly hair, increased rapidly in bulk, and showed a strong tendency to pass quickly into a gangrenous condition. The local coldness of the tumours was not noticed in all cases, and never unless the affection was well advanced.

When the tumours became well developed, the other symptoms became rapidly aggravated. The anxious expression increased, the pulse became more frequent, and the conjunctiva, previously of a yellowish-red, frequently showed petechiæ; the breathing at the same time became difficult and laboured. As these symptoms increased, the patient would sometimes become violently excited, dash himself about violently as in a paroxysm of colic, look at his flank, and undergo partial sweats about the ears and flanks. The shiverings became more marked and frequent, the pulse quick and small, and the mucous membranes deeply injected, varying in colour, from a yellowish-red to a deep brown. The breathing became sighing, the breath foetid, the eyes fixed and withdrawn into the orbits, or sometimes put in violent agitation, and the nostrils, widely dilated, discharged a brown spumous, though sometimes also a black and sanguineous liquid. The mouth was filled with a frothy spume, containing commonly some particles of a deep livid colour, evidently detached portions of the sphacelated mucous membrane. The tongue became greatly



engorged, immovable under the power of the will, and of a reddish-black colour. The anthracoid infiltration extended over the lips, cheeks, and other parts of the head, transforming the whole into a hideous mass, the skin became cold, the general excitement merged into violence, and the physical powers underwent great prostration. The walk was uncertain, with the legs wide apart; the creature could not remain in the recumbent position; the belly became rapidly tympanitic, and muscular spasms spread over the body, commencing in the face and neck and extending to the limbs. In some cases death took place quietly, and at others in the midst of the violent symptoms above enumerated.

Autopsy.—The body was always much swollen soon after death, especially the abdomen. The nostrils discharged a quantity of liquid similar to that which flowed from them before death. The rectum was everted, had its mucous membrane black, and allowed the escape of a black, sanious, and fœtid fluid. The odour from the carcasses was insupportable, and the tumours frequently presented spots of ecchymosis on their surface.

On removing the skin, the ecchymoses were found to correspond to black patches on its inner aspect. Much gas and some black blood escaped from the subcutaneous areolar tissue. The latter structure contained not only black, but also red and yellow infiltrations. These were most plentiful round the tumours, and penetrated deeply into the interstices of the muscles. The muscular system was infiltrated with black, tary blood, and decomposed rapidly after death, so that they had become black, soft, and friable a few hours after death. The tumours in other parts than the neck were of a fine citron colour. In one tumour at the entrance of the thorax sphacelus had commenced. The tumours on the head, and especially the throat, had a more or less black hue, and in the worst cases was soft, black, and pulpy, having indeed all the characters of gangrene.

The laryngeal and pharyngeal muscles were gangrenous, as was also the mucous membrane of the pharynx. The pituitary membrane was thickened and black, with some traces of ulceration. The trachea and bronchial tubes were filled with a sanguineous froth; its mucous membrane showed at certain points traces as of active inflammation, while towards the pharynx there were ulcerated patches.

The pleuræ presented red or black patches of varying extent, and the substance of the lung which crepitated freely was, in the first two cases, infiltrated with a citron-coloured fluid. In the fourth mare that died, an anthracoid tumour which occupied the breast extended backward within the thorax as far as the level of the heart. The heart and principal vascular trunks contained a black, tary, incoagulable blood, and the endocardium was abnormally red. The liquid contained in the pericardium was invariably of a reddish tint.

The lymphatic glands were enlarged, red, black, yellowish, or citrine. Some were completely softened, and presented the different characters of putrefaction.

The intestines had a red colour, which merged into a more or less deep black on certain points of the small intestines. The peritoneum was generally considerably reddened, with black patches interspersed, and in its cavity was a variable quantity of liquid of a red, blackish, or citron colour.

In all the pregnant mares which had other external tumours than those on the throat, the folds of the mesentery were thickened and distended with black blood of a pulpy consistence. In the remaining mares there were tumours on the sublumbar region, frequently weighing as much as 13 lbs., and composed of black semi-liquid blood, or of a yellowish serosity of a gelatinous consistence.

The intestinal coats varied in thickness, but were usually considerably infiltrated, and presented different tints, from a bright red to a black hue. Usually a large amount of black blood was mixed with the intestinal contents, and conferred on them a powerfully repulsive odour.

The spleen seemed almost healthy in some subjects, whilst in others it had



attained to three times its normal size, and furnished on pressure a semi-liquid grumous material of a very black hue and a septic odour.

In five cases the liver was enlarged, filled with black liquid blood, and very friable. When the sublumbar tumours existed, the kidneys were more or less implicated.

In all the pregnant mares the uterus showed spots of ecchymosis on its outer aspect, and the placenta contained a large amount of black diffuent blood. In two instances a yellowish tumour, marked with reddish spots, existed around the umbilical cord.

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## POISONING OF CATTLE WITH COLCHICUM AUTUMNALE.

By M. A. BARRY, Veterinarian at Aisne.

(From *Receuil de Médecine Vétérinaire*, for December 1862.)

M. BARRY records three different cases illustrative of the toxic properties of this agent, when partaken of by cows.

1st, In one instance, on the 28th May, a cow and heifer partook of cut grass containing a considerable amount of the meadow safron. They ate freely, as it was the first supply of green meat that season. Some hours later, they had violent colic, pawed with their fore feet, turned the head to the flank, and lay down and rose frequently. This was followed by profuse and slightly bloody diarrhœa, with violent tenismus, general coldness of the surface of the body, and general rigors.

The owner administered oil and tea, and the following morning called in M. Barry, who noted the following symptoms:—Anorexia, stoppage of rumination, great prostration, coma, coldness and insensibility of the skin, dry muzzle, staring coat, eyes strongly retracted, injected conjunctiva, great constipation, with tenismus, marked tenderness of the abdomen, hot mouth, salivation, laboured breathing. The patients can only be raised with difficulty, and are scarce able to stand. In the cow the symptoms were less violent, though the suppression of milk was complete.

The treatment consisted of mucilaginous draughts and glysters, composed of decoctions of barley and linseed, with a few drachms of sulphate of soda. Active hand-rubbing to the whole body, and warm clothing, were also enjoined.

On the 31st May, the cow was considerably better; all the symptoms were greatly moderated, the secretion of milk had, to some extent returned, as well as the appetite and rumination.

In the heifer, on the other hand, the symptoms are aggravated. She is thoroughly prostrate, lies with her head on her shoulder, is still salivated, has a small, almost insensible pulse, and is still obstinately constipated. The injections are expelled as thrown in, there is violent tenismus, the rectum, frequently protruded, is of a deep red colour, and covered with reddish mucous, and the abdomen is tympanitic. Opium was now added to the injections.

The following day the cow had quite recovered, but the heifer had sunk during the night.

2d, In the second case, a number of cows were supplied with a quantity of pure colchicum, which had been collected from a meadow, but fortunately they ate a small quantity only. They were all attacked however, after the lapse of a few hours, with violent colic, severe diarrhœa, suppression of the lactory secretion, &c. These animals recovered under the influence of emolient draughts, and mild saline remedies.

3d, The third instance was very similar to the second, and was treated successfully in the same way.

Mr Barry supposes that the greatest risk of poisoning from this agent is when the animals first receive green fodder in the spring, and when it is intimately mixed with other edible plants.

## INTERMITTENT LAMENESS CAUSED BY THE OBLITERATION OF THE AXILLARY ARTERIES.

By M. GEORGE, junior, Veterinarian at Sainte-Menehold.

(*From Recueil de Médecine Vétérinaire, November 1862.*)

THE subject of this malady was an entire draught horse, eighteen years old, and which had been previously worked in an omnibus. While drawing a load of manure he suddenly fell, and was not only unable to rise, but even to move his fore-limbs. After a short time he got up and was led off at a quick walk to the house. Before he had gone fifteen paces the lameness showed itself, and in less than ten minutes the fore-limbs trembled violently, and became very unsteady, while convulsive movements took place in the head and neck. If walked, the limbs were semiflexed. The breathing was laborious, the beats of the heart tumultuous, the animal restless, the expression haggard, and the skin bathed in perspiration. The two fore-limbs, however, were dry, and the skin was cold.

After standing a quarter of an hour these symptoms had almost entirely disappeared, and in half an hour the animal was inclined to feed.

He was conducted toward the stable at the same pace as before, and within twenty paces of the door fell down in the same condition as before. In half an hour more he had completely recovered, and was taken slowly to the stable.

The horse was put for a short time to light work, but as the attacks returned several times, he was disposed of, and fifteen days later he died.

At the autopsy the two axillary trunks were found filled with hard resistant clots, which were firmly adherent to the arterial walls. The main trunks have been preserved in spirits of wine, but the branches were not dissected, and though blocked up at their origins, it is unknown how far this extended.

The muscles of the limbs were not blanched, and presented nothing worthy of note, and the same remark may be made of the nerves.

## BLUE MILK.

By M. MATHIEU, Veterinarian at Sévres.

Read to the Imperial and Central Society of Veterinary Medicine.

(*From Recueil de Médecine Vétérinaire, November 1862.*)

M. MATTHIEU has made several experiments with the view of ascertaining whether the condition of milk to which the above name is given depends on the cow or on the dairy.

In one case, where a single cow was kept, the milk of which showed this peculiarity, new dishes were employed, and still no amendment took place. M. Mathieu drew milk into two new vessels and placed them in the dairy; he then drew milk into two glass bottles, stopped them carefully, took them to his residence six miles distant, and placed them in a chamber, the temperature of which was 15° Cent. Three days later, blue spots showed themselves on the surface of the cream in the two glass vessels, and after other three days, having occasion to visit the dairy where the milk had been set at the same time, he found that it too was covered with blue spots.

In another case two cows were kept, one black the other white. The milk was always mixed, and soon become covered with blue spots, which interfered with its sale. M. Mathieu caused the milk to be placed separately in two new vessels. He then drew some into glass bottles as before, took them home (six miles), and placed them in a room different from that of the former experiment. On the fourth day the milk of the white cow was covered with blue spots, while that of the black retained its original colour. These experiments have been repeated twenty times with a result invariably the same.

M. Matthieu seems justified in his conclusion that blue milk is in reality dependent on disease in the cow, rather than the condition of the dairy.



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### ORIGINAL COMMUNICATIONS AND CASES.

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*On Disease in Cattle.* By E. HOLLAND, M.P.<sup>1</sup>

THE subject of this paper is one which comes under the heading "Causes which affect the condition of the Public Health."

It has reference to the increased and still increasing sale of diseased meat and milk in our markets, and to the consequent extension of disease amongst the consumers of such food.

My attention was first drawn to this subject last spring, previously to the meeting of the Royal Agricultural Society at Worcester. The inspecting officer of that city having seized several head of cattle exposed for sale whilst suffering from the foot and mouth disease—and these animals being condemned—his conduct gave great offence to many dealers, graziers, and others who were in the habit of attending the Worcester Market, and they forthwith endeavoured to establish a market, which, if they had succeeded in establishing, would have been to all intents and purposes a market for the sale of "diseased" animals, held on a certain spot *without* the boundary of the city authorities; but this spot was contiguous to the ground prepared for the Exhibition of the Royal Agricultural Society of England, and, as a member of the Council of that Society, it was my duty to consider how the danger of contagion might be avoided, and how the very valuable animals about to be assembled together might be protected from infection. With this object in view, I had occasion to refer to the Acts passed for the prevention of the spread of infectious and contagious diseases amongst our domestic animals. These Acts I found totally inadequate for the purposes for which they were passed, and most defective also in their operation regarding the prevention of the sale of diseased meat in our markets. I felt it my duty consequently to bring these important questions before Parliament, and therefore, in connection with Sir Wm. Miles, I last session introduced a measure which it was thought might, if

<sup>1</sup> This and the following paper were read before the Fourth or Public Health Department at the meeting of the Association for the Promotion of Social Science, held at Edinburgh from 7th to 14th October.

it became law, save the breeder and grazier from the enormous losses to which he is now liable through death from contagious and infectious diseases amongst their stock, and which it was hoped might diminish the amount of sickness and mortality amongst ourselves, arising from the consumption of meat and milk unfit for human food.

We were, however, frustrated in our intentions, actively—

1. By the strong opposition raised against the measure by cattle-dealers, salesmen, dairymen, and others. These parties were impressed with the idea that ruin to them must inevitably ensue if more stringent measures were passed for the prevention of the spread of diseases amongst cattle and other stock.

2. Passively—By the want of knowledge on the part of Government as to the real extent of disease existing in the country, and of what it was necessary should be done in order to check its progress.

The Home Department is now, however, convinced that legislation on this subject is defective, and that further action is necessary. As a temporary measure, they have inserted a clause in the present Nuisances Removal Act, by which, without waiting until bad meat be exposed for sale (as has been the case hitherto), it may be seized on any premises at any time; and having renewed for one year the present Act for the Prevention of the Spread of Diseases amongst Cattle, Sheep, and Horses, they are pledged to introduce a more stringent measure for the attainment of that end when the year expires.

With your permission I will trace up the causes which have led to this enormous traffic in diseased meat and milk, so deleterious to health, and so detrimental to the interests of our farmers, graziers, and dairymen, and which has raised a race of butchers into existence who, by trading and jobbing in diseased meat, have made fortunes at the cost of the health of the public at large. But first let me state, that it must not be supposed that the poor alone are consumers of diseased meat; it is often so disguised that housekeepers and cooks, and respectable butchers, perhaps having special orders for a particular cut which may not be on hand, are constantly taken in, more especially in cases of meat procured from *Private* slaughter-houses—slaughter-houses which are usually found, as is stated in a recent report, “in alleys and closes where there is not sufficient room to keep live animals waiting to be killed, nor adequate accommodation to dispose of the offal, and where much organic matter remains putrifying in the fissures of bad pavements.” These slaughter-houses (private slaughter-houses) it is impossible to superintend, scattered as they are in great numbers over a wide area. In these houses bad meat is prepared and “polished up” for the consumption of the rich as well as of the poor.

Professor Gamgee, in the report alluded to, gives a graphic description of what he has himself witnessed in this respect. In London (he reports), “I have seen butchers in such places dress extremely diseased carcasses, and ‘polish’ the meat. This filthy



practice consists in killing a good fat ox at the same time that a number of lean and diseased animals are being killed. Boiling water is at hand, and when the lean animals have been skinned, their flesh is rubbed over with fat from the healthy ox, and hot cloths are used to keep the fat warm and to distribute it over the carcase, that the carcase may acquire an artificial gloss, and an appearance of not being totally deprived of fat. In Edinburgh (the Professor continues), I have seen sickly lambs without a particle of fat about them dressed up with the fat of healthy sheep much in the same way. From the private slaughter-houses in London I have known even the diseased organs themselves sent to the sausage-makers,"—and so on. After such a statement of facts, you will, I think, agree with me that the slaughtering of animals in large towns ought to be carried on in public abattoirs alone, and that these private killing-houses should be put down by authority of the law.

It was not until the comparatively recent period of 1842 that severe losses occurred amongst our domestic cattle. Up to that time there had been but very few importations of cattle from the Continent. One or two cases are on record of an animal being allowed to enter Great Britain for breeding purposes, but in 1842 the ports were thrown open to foreign stock. No precautionary measures were at the same time taken for excluding unhealthy stock—therefore in 1842, with free trade in cattle were also introduced Continental diseases; and instead of losses amongst our own stock never rising (as previously to 1842) higher than 2 per cent., we have now to struggle against a loss from diseases amongst our animals bred at home of frequently 8 and 9, and in some counties of 10 and 11 per cent. Now, as long as the percentage of deaths was small and scattered over a lengthened period, the loss was one which the farmer could put up with, and the universal practice then prevailed of burying the carcasses of animals which were victims of disease, for it was comparatively a rare event at one time to have a diseased or a dead bullock on a farm; but soon after the importation of foreign stock in 1842, pleuro-pneumonia exhibited itself as an imported disease, until at length nearly one-half of our animals are killed by this insidious pleuro-pneumonia; and shortly after, as deaths from this cause occurred in increased numbers, the system of burying the diseased carcasses ceased; and, as Professor Gamgee eloquently writes, a set of men sprang up who, offering little more than hides' price for diseased cattle, bought them up for the large towns. The number of such individuals increased, and at present there is a keen competition for a cow affected in the last stage of pleuro-pneumonia.

#### THE PREVALENCE OF DISEASE.

Live stock insurance companies were formed immediately after

the importation of foreign diseases,—the first being established in 1844. In spite of the wealth and influence of its patrons, in spite of repeatedly raising its rates of premium, pleuro-pneumonia swept off victim after victim in so incredibly short a space of time, that the company, and succeeding companies, were unable to meet the heavy demands made upon them in compensation for losses amongst insured stock, and their affairs became hopelessly embarrassed. The same fate fell to the lot of the other numerous speculations afloat in connection with the insuring of cattle. The business done was enormous,—in one society alone ten millions of stock was insured, but, as we learn from the annual report for 1848, in reference to epizootic aphtha, or “the foot and mouth disease,” and more especially to pleuro-pneumonia, or the “new disease,” in some districts thousands were carried off; so great, indeed, were its ravages, that nearly three-fourths of the losses for which claims were made on the company were the results of that incurable disease.

Thus, then, farmers and graziers found no longer security against loss through the medium of insurance companies. These, after having calculated that their utmost possible losses would be coverable by a premium of  $3\frac{1}{4}$  per cent., eventually exacted premiums of more than double that amount, and yet came within a few years to ruin, so that the breeder took refuge against loss by selling diseased stock for human food; a system which still prevails and will continue to prevail unless public opinion is directed towards this evil, and the consumer—that is the nation—interferes.

Some five years ago a Parliamentary Committee sat upon this very question of the existence of diseases amongst animals used as human food. They heard the evidence of graziers, butchers, and others interested in the trade for several days, and at length they reported that they acknowledged the existence of diseased meat being extensively sold in the markets of the kingdom; still that, through an order in Council, the Government of the day had always the power of interfering to prevent extreme evil consequences arising from such system, and that any further steps taken for checking the sale of diseased meat would be an undue interference with *legitimate trade*!

With *legitimate trade*! so it has come to this pass, that during the last twenty years diseased meat has been so constantly and extensively sold in our markets, so widely consumed, that a Committee of the House of Commons declares that to interfere with the supply of it to consumers would be an undue interference with legitimate trade! Legitimate trade! why, let me read to you an extract from a letter addressed by Dr Letheby, the experienced medical officer of London, to your talented and energetic fellow-townsmen, Professor Gamgee. It is dated January 1863—and he says as follows:—

“My opinion of the injurious effects of diseased meat on the health of those who make use of it is very decided. I have seen so much mischief from it that I do not hesitate for one moment to say



that some legislative measure is most pressingly wanted to prevent not only the traffic in diseased meat, but also to prevent the slaughtering of diseased animals. Such regulations are now in operation everywhere on the Continent, and they are much needed. In the city markets alone my officers seize from one to two tons of diseased meat every week. Last year we seized 110,046 lbs. of meat, of which 78,697 were diseased, and 13,944 from animals that had died. We often pursue the offenders into a court of justice, and have them fined or imprisoned, but I feel that the mischief should be stopped *before* it reaches the markets. Officers are wanted to examine the cattle before they are slaughtered. As to the effects of such meat on the human subject, I have seen many cases of illness from it."

Again, the following is an extract in a Report from the Commissioners of Sewers in London, issued in September last :—

"Our medical officer reports that the markets and slaughter-houses had been duly inspected, and that the officer had condemned, in the course of the last six weeks, 43,523 lbs., or rather more than 19 tons of meat, as unfit for human food : it consisted of 166 sheep, 34 calves, 53 pigs, 193 quarters of beef, and 804 joints of meat—29,516 lbs., or more than half of the whole quantity was putrid—[the putridity having been caused by the unusually warm weather in the early part of last month] ; but that 9866 lbs. were diseased, and that 3211 lbs. were from animals that had died from accident or disease."

As a sequel to this report, I here insert the substance of a petition presented to Parliament last session by the Metropolitan Association of Medical Officers of Health, since it points to the consequences of the consumption of bad meat and bad milk :—

"That this Association has information of a very serious amount of disease existing among the cows of the London dairies, and knows that animals thus diseased are habitually slaughtered and used as human food. Further, that a large number of diseased animals are daily imported into London, and are exposed in the markets, their disease being often of a contagious character, and that these also are killed in the various slaughter-houses of London for human food. That this Association has reason to believe that much disease is produced in the human subject by the consumption of the meat of diseased animals."

Such being the present condition of our meat and milk markets (*for such as the London market is, so are all our large markets throughout the kingdom*), we have next to consider how this evil has to be dealt with, and whether a system which has been in existence so long as to be regarded as a legitimate trade shall be interfered with so as to prevent its pernicious effects upon the community, whilst, gently and judiciously applied, that interference shall not injuriously or suddenly affect the interest of those who are connected with the trade ; for a great deal of injustice may always be perpetrated in endeavouring to remedy a public evil. But in this case, I do not think that a *full*



*and complete* system of inspection at the ports, as well as in the markets, would be an act of injustice to any branch of trade. What the experience of the last year has taught me is, that Government is not aware of the extent of disease existing at any one time throughout the country. They *are* made aware of any particular outbreak of disease in any particular locality; but that is only *after* that disease has disseminated and after losses have occurred. What they require is some machinery by which notice might be given to them of the approach of disease, and of what steps should be taken for impeding its arrival and arresting its advance; and then, under an Order in Council, there might be prompt, early, active operations, instead of, as now, action taken after the disease has disseminated itself—after mischief has occurred.

I believe that much good would ensue from the establishment of an Inspector-General of Live Stock Traffic throughout the United Kingdom. His duties should be to collect reliable information as to the health of stock, whether imported from abroad or circulating in the home trade,—to keep himself in communication with the different inspectors of towns, fairs, and markets, throughout the country. He would have to visit different localities and to give attention to the reports of outbreaks of disease, more especially to the spread of contagious disorders in all countries from which importations are made to this. It would be the duty of such an inspector to investigate special outbreaks of disease with a view to determine the causes producing them, and he would suggest to the Privy Council proper measures to arrest the progress of such disease; and, whilst in communication with local inspectors, and adopting with them special precautionary measures against the propagation of disease, should it appear in any district, he should report to the Privy Council what steps ought to be taken on the occasion. Besides, he should report annually on the diseases of animals in the United Kingdom. Such a report would enlighten farmers as to the best means of protecting their stock in health, and would directly lead to a great diminution in the traffic of diseased animals. But here exists another difficulty: Who are to be the inspectors? Are they to be, as they too frequently are at present, unqualified men for the office, chosen frequently through corporate interest rather than on account of their veterinary knowledge; or are they to be well educated, scientific veterinary practitioners? Indubitably they are to be the latter; but then, where are these to be found? My belief is, that from the want of a high grade of education amongst professional men, the farmer has taken up the impression that medical treatment could do nothing for him; that spending money in attempting to cure his diseased animals was a farce; and hence, that he has had further inducement to send his sick animals to market whilst life was still in them. Had there been in existence a sufficient number of well-qualified veterinary practitioners, he would have acted otherwise, and not have incurred such serious losses as he has



done through the dissemination of contagious and infectious diseases.

Statistical returns up to the present time show, that the number of members of the Royal College in practice in the United Kingdom is only 1018, whilst the number of those who assume the title of *veterinary surgeon* is 1244, and those practising as farriers, 1109.

The number—1244—who unscrupulously assume the title of veterinary surgeons, which the possession of the diploma alone ought to confer, affords a striking proof that the profession requires some legislative support. It is expedient that persons requiring veterinary medical aid should be enabled to distinguish the qualified from the unqualified practitioner; and it is a gratification to know that a measure is to be brought next session before Parliament, having for its object the punishment of such persons as shall wilfully or falsely take or use the name or title of veterinary surgeon, and practise under that title without being duly qualified to assume it. At the same time the framers of this bill have taken care that it shall not be retrograde in its action, and that its provisions shall not affect any person actually practising as veterinary surgeon previously to October 1864.

Upon a more perfect system of inspection both at our ports and in our markets, and upon a wider spread of scientific professional knowledge, do I rely for improvement in the quality of food supplied to consumers, for a diminution of sickness and death arising from the consumption of diseased meat and milk; and further, to the same sources do I look for a diminution of the immense losses incurred by the farmers and graziers through slaughtering for food instead of attempting to cure their diseased animals.

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*The System of Inspection in Relation to the Traffic in Diseased Animals or their Produce.* By Professor GAMGEE, Principal of the New Veterinary College, Edinburgh.

FOR some time past, the attention of agriculturists has been drawn to the importance of breeding and fattening live stock in the British Isles, to a far greater extent than hitherto. The low price of grain, and the risk attending its cultivation, naturally induce a disposition to invest capital in the production of meat, which is annually growing dearer, and, in proportion to the growing population, much less in quantity than it was formerly.

Irish agricultural statistics prove that the amount of live stock annually reared has diminished of late years. That this falling off has been general in the three kingdoms, is shown by the statistics relating to the supply of meat in the metropolis. In a very interesting article by Mr Robert Herbert in the "Journal of the Royal Agricultural Society," it is stated that, "Although the population of

London has, according to the last census, increased in ten years from 2,362,236 to 2,803,034, we find that an increase of only about 10,000 more beasts were exhibited in the last half of 1862 than in 1853; whilst the number of sheep has decreased by 101,129 head, even though in 1862 we received 37,843 beasts and 178,554 sheep, together with 12,279 lambs, from abroad. The number of calves gradually declined from 17,058 to 12,579 head; but it may be observed, that included in the latter number were 11,436 from the Continent." The supply of meat from the country in Newgate, and Leadenhall Markets has also failed to keep pace with the increasing population; and it is admitted that the total supply of live stock for consumption, not only in the metropolis, but in other large towns has fallen off. I need not enter into a comparison as to the prices of butcher meat, as their rapid and extraordinary increase has been a subject of general comment.

When we glance over the tables showing the percentage of beasts supplied from different parts to the Metropolitan market, where the foreign stock is chiefly offered for sale, we find that not more than 10 or 11 per cent. of the total supply is from abroad. It is quite evident that not only has the foreign supply not kept pace with the demand, but the amount of British stock for slaughter has seriously diminished.

It has been my duty of late to draw the attention of the Government and the people of this country to the cause of the great deficiency in the supply of animal food. We have gone on losing from 5 to 10 per cent. of our animals by disease without noticing the effect of such a loss on the production of meat. We have opened our markets to the foreign dealer, and our farmers have become acquainted with diseases which twenty-five years ago were unknown amongst us. I have shown that one foreign plague alone—the lung disease—has destroyed twice as many head of cattle as the number imported,—the absolute loss being still greater than would be indicated by this proportion, owing to the much greater value of our own as contrasted with the foreign beasts.

Calves to rear, and store cattle to feed, have been growing dearer and scarcer; and in districts devoted to grazing and stall-feeding, when there has been an abundance of food, the British farmer has been compelled to buy from abroad, and, as a rule, has suffered severely by disease.

It is, moreover, a well-known fact that the introduction of foreign cattle-plagues into this country, and the progressive increase in the price of butcher meat, have induced farmers and butchers to sell to the public, as human food, every animal dying or slaughtered diseased. In addition, therefore, to the supply of animal food having diminished, we have a source of deterioration unknown in times when our ports were closed to foreign live stock. No one will doubt that scarcity of animal food will engender disease in a hard-worked population such as our own, and few will venture to assert



that the public health is benefited by the meat-supply being largely deteriorated by disease.

A few very short-sighted farmers have said, that if the traffic in diseased animals were checked, as I wish, hundreds of poor people would be deprived of animal food. I can add to this, that the rich as well would be denied the privilege of a diseased beef-steak. There is no greater error than that of believing that the poor eat the diseased meat. The prices that I know to be daily realised from oxen and cows suffering under some of the worst forms of disease, indicate that the wealthiest in the land must be consuming them. During the past summer I ascertained in Lincolnshire, that sheep poisoned with mercurial ointment had been sold in Newgate for more than healthy mutton would realise in the country. And if a diseased cow from an Edinburgh dairy can fetch from L.12 to L.20, it cannot be said that paying 10d. per pound for meat is a guarantee that the quality obtained is good. A person who buys up diseased cattle from all parts exclaimed a few days since, with reference to attempts of my own to check the traffic, "We are winning too much to give up the trade."

At present the only means adopted to prevent the sale of diseased meat is (1.) To prevent, if possible, the introduction of diseased animals from abroad by inspection at our ports ; and (2.) To inspect slaughter-houses and dead-meat markets.

The inspection at ports has been of some service ; but it is well known that foreign diseases are constantly introduced by means of infected stock, which may even appear healthy when landed. The inspection of slaughter-houses and dead-meat markets has been wretchedly bad, and in many large towns, as in this city, worse than useless. The diseased-meat trader has found a cloak in the law which has emboldened him to persevere and accumulate wealth. Contractors have unhesitatingly undertaken to supply meat for our soldiers and public institutions below the market price, and have not failed to find inspectors who have enabled them to do so with perfect safety. This never would have happened if our system of inspection had been a good one.

To stop the traffic in diseased animals we must prevent disease. But we cannot accomplish the latter object without a general system of enlightened inspection,—such as we have indicated long since. If we cannot feed our people it is because we allow good food to be destroyed. If money cannot draw to our markets an adequate quantity of healthy stock, it is because we know not where to find the stock. Cows are being killed by disease, calves die in large numbers, bullocks catch the lung-complaint, and withal we expect there is to be an increase in the production of beef. This great desideratum is quite unattainable without setting to work heartily to prevent disease. However anxious our farmers might be to invest capital in live stock next year, they would not get the live stock to buy, and if they searched the Continent for it they could



not get the quality, and would certainly lose by foreign plagues. This shows us that we must husband our resources at home. We have the finest cattle and sheep-rearing districts in the world, and we can produce as much as we want, but to do this we must protect them from plagues both of home and of foreign origin. The loss of stock implies the loss of manure as well as the waste of food, and I repeat what I have said on former occasions, that the prevention of cattle disease would save us many millions sterling annually, and would add more to the resources of this country than the progressive reclamation of waste land. It is not more land we want so much as making good use of what we have. The same amount of land at present utilized, and the same amount of capital at present employed in the production of meat, should, by attention to the health of stock, lower the price of butcher-meat within the next ten years as much as it has increased during the past ten. This statement may startle some, but I do not advance it without very mature reflection. Our population is not increasing at such a rate that the production of cattle could not for many years to come keep pace with it. Artificial foods enable us to crowd large masses of stock on a limited extent of country, and all we want to accomplish this is to obtain healthy animals, on which the farmer knows that he need not calculate on having losses to the extent of from ten to twenty per cent. Why we should allow this—the healthiest stock-producing country in the world—to be the most diseased, is a mystery only explained by a knowledge of the ignorance on all such subjects throughout the length and breadth of the land. There is not another nation in civilized Europe where the mortality amongst cattle and sheep is as high as here, and the reason of this is that our neighbours attend to what we neglect. They have the diseases, but they keep them in check; and if the same attention were paid to such subjects in our own islands, separated as they are from plague-breeding continents, we could easily exterminate maladies which can only be limited in frequency and moderated in virulence abroad.

It is easy, therefore, to show that the prevention of disease amongst animals would pay—that inattention to such a subject is seriously injuring this country; and it is also easy to demonstrate that neglecting our diseased animals implies encouraging the prevalence of disease in man.

I know of no important malady that cannot be prevented with the greatest certainty—and that cannot be arrested when it has appeared. I cannot here dwell on details, and have only time for a few remarks on a rational system of inspection in relation to the traffic in diseased animals.

*Firstly*, The traffic in disease is especially prejudicial wherever contagious diseases prevail. The first point to attend to, then, is to ascertain where such maladies are constantly manifesting themselves. Abroad this is published in gazettes. Here it would be necessary to compel farmers and others to notify any outbreak to the nearest



recognised cattle-inspector, or to the police. The object of such notice would not be to annoy the farmer, but to protect the district and the country at large. Preventive measures could then be adopted, and disease at once stopped. On the present system the outbreak of any contagious affection is followed by the sale of stock in various lots, and forty or fifty farms in one season are contaminated from the first appearance of disease on a single one. I have traced as many as a dozen outbreaks to a single sale by auction on a farm where the lung-disease had recently broken out. My system of inspection would therefore begin on the farms; and that this would work well is proved by the experience of a century on the Continent, as well as by our own experience in dealing with small-pox in sheep. The effect of the system can be understood at once by referring to such a disease as scab in sheep. If, on the appearance of this disorder, notice were given to some competent authority, within a month the disease could be eradicated from any farm; whereas now we find it continuing in a district for years in succession, and flocks of sheep sent periodically to market to spread the malady in all directions. A pretty spectacle in an enlightened country such as our own was afforded recently by one district not far from Edinburgh, in which, during winter, the decomposing carcases of scabby sheep were so common, that there was no possibility of hunting over it, the hounds could scarcely be got off the ground. We should therefore have competent scientific veterinarians in every important agricultural district, to assume the responsibility of preventing disease wherever it might appear. This cannot be left to the discretion of the farmer, as many of the richest breeding and grazing districts in this country are without a veterinary surgeon. The farmers dispose of their diseased animals, and do not treat them.

*Secondly*, The district veterinary inspector could examine stock exposed for sale in fairs, and attend to fairs being held where there would be the least danger of spreading contagious diseases, if any such were in his district.

*Thirdly*, Private slaughter-houses should be abolished, and if any such are established in the vicinity of large towns, there should be a tax, so as to defray the expenses of inspection. No sooner do we agitate the question of the slaughter of diseased animals in Edinburgh than half-a-dozen slaughter-houses start up outside the city boundaries. There should be no boundaries in a country like this, within which diseased cattle are condemned, and outside which they can be freely killed and sold. If the butcher choose to slaughter outside, he should pay for being looked after.

It must not, however, be imagined, that the erection of a single public slaughter-house for any large town is in itself a guarantee that the slaughter of diseased animals will be checked. In no city in the three kingdoms is there a more unreserved traffic in bad meat than in this, and greatly has it been encouraged by the useless



system of inspection at present in force. I could relate singular anecdotes, which show how bold and independent in their nefarious dealings, the diseased-meat butchers become, when they find by experience that it is a very simple matter to deceive the inspector, or to cause him by threats or fair promises to relax in severity. Since I have been in Edinburgh, many cases have come under my notice in which prosecution for the sale of diseased meat could not be carried out in consequence of the manner in which the wily trader had committed an inspector to a definite line of action. Diseased animals have been seized in butchers' shops, and the persons in whose possession they were found escaped unpunished, because they had taken the precaution of adopting the legal method of submitting the carcase to inspection. Only last week I ascertained the facts of a startling case of this description. A butcher passed into the slaughter-house a number of animals, and amongst them a diseased one. As usual, the animals were slaughtered and dressed, and an official ordered the diseased one to be kept in the booth for subsequent inspection. Very ingeniously, however, the carcase of a healthy animal was substituted for the diseased one, and in due course was passed, much to the amusement of a large number of butchers, who enjoyed the trick. Why shall one animal be inspected and another not? It is quite evident that the advantages of good public slaughter-houses, such as this city is provided with, are quite neutralised by improper inspection.

*Fourthly*, With regard to the inspection of slaughter-houses, it should be conducted by a veterinary surgeon, aided by a sufficient number of officials of a different class. Animals should be examined alive, and not only their carcasses after being dressed. I have known a man slaughter an animal with the lung-disease, and show an ignorant inspector the lungs of a healthy one, having, of course, hidden the diseased one, and thus securing that the carcase was not condemned. A scientific inspector would contribute much to the advancement of veterinary medicine by a study of pathological anatomy in any of our slaughter-houses, and would constantly supply information as to the nature of prevailing diseases, so as to indicate how best to stop losses which stockowners might be sustaining. This is not all. Recent discoveries demonstrate that the maladies in animals which are most certainly transmitted with fatal effect to man, belong to a class which can alone be recognised and studied by the accomplished anatomist and the microscopist. A superficial glance of a specimen of diseased meat may indicate its probable unwholesome character, but a close examination by a professional man can alone in many instances determine whether it may be eaten with impunity. Unfortunately, there are no general and easily recognised signs to acquaint us of the fact that some kinds of meat are poisonous. Herein lies the danger of sanctioning the slaughter of diseased animals at all, and the necessity of preventing disease rather than permitting it so to destroy cattle as to encourage more or less



the sale of material which is at times calculated to injure human beings.

*Fifthly*, Attention should be paid in every important town to the dairies which supply our thronged populations with milk. Whether these dairies be within city boundaries or in the country, they are at present subject to contagious maladies due to the general traffic in diseased animals. The practice of licensing cow-houses so as to sanction the existence only of good ones, the periodical whitewashing and complete purification of these houses, and the best attention to ventilation, fail to have any effect in checking the spread of maladies which are caught by cattle in their transit from the breeder's hands to the cowfeeder. Close and constant inspection of town dairies, and the adoption of specific preventive measures, are needed to exterminate the frequent plagues which never entered our filthiest cowsheds previous to the importation of stock in 1842. I am quite prepared to organise in any large city, if only as an experiment, a system which would at once reduce the mortality of town dairy cows from 30 and 40 per cent. to 4 and 5. This would save the cowfeeder, and protect the public. The diseased cows need not then be taken by hundreds yearly to the shambles, as they are in this city, but might be preserved, and slaughtered when in a healthy condition. This country would be largely benefited by the adoption of proper means to protect the lives of calves born in large towns. There is a yearly mortality of upwards of 50 per cent. amongst these animals—and much are they needed by the British farmer. It is needless to speak and write on the feeding of more stock and growing less corn, unless we provide means to preserve the young animals annually born. A very large number of calves that have never sucked their mothers, or otherwise drank a drop of milk, have their throats cut, and are eaten. This is reckless and improvident waste, which entails great loss on the country, and on no class of individuals so great as on the British farmer. If lean stock is so dear that it can scarcely be bought to fatten with profit, it is evident that we should preserve the lives of young animals, which in the course of a very few months after birth attain great value.

Important as this subject is, the time at my disposal is far too short to enter into further detail. I must add, however, that the British Government should encourage the collection of information relating to diseases amongst domestic quadrupeds; and whatever system of inspection is adopted, it should work under a common head, who could glean for the public benefit a large amount of varied and most useful information, which would prove of the highest importance to this country, and especially to the increasing class of stockowners. The comparison of observations made in different parts of the country would tend more to demonstrate the nature of causes operating for the destruction of animal life, than any other method of investigation.

As it is very necessary that this subject should not only be agi-

tated but worked at, I have to ask all who recognise its importance to join our new Society for the Prevention of Diseases amongst Animals. It is a Society calculated in a short time to do much good, and it is the desire of its promoters that it should not be local, but assume a national character. With this hint, which is the only one I can throw out, to insure a useful amount of co-operation without much delay, I conclude, and trust that the farmers of this country will soon see that it is their interest to prevent disease rather than to sell diseased animals—and that the public will learn that the manner to secure an abundance of cheap and wholesome animal food is to alleviate the sufferings of the sick animals which are eaten, as they are cruelly neglected and exposed to causes of contamination such as it should be our duty as it would be to our benefit, to purify and remove.

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*On Diseased Meat.* By JAMES HIGGINS, Inspector of Meat, Leeds.

THE subject of Diseased Meat has for some time past engaged the attention of the Town Council of this borough, and the means they have adopted to prevent the sale of such meat, was to appoint an experienced butcher as “Inspector of Bad-meat, Slaughter-houses,” &c. In that capacity I have had considerable experience, and I now propose to lay before you certain facts and statements, which I hope will be worthy of your attention.

I will first give you some account of the traffic in diseased cattle and carcases within the limits of this borough, a traffic that has so much increased of late years, “that it was considered advisable, to *prevent smuggling*, in case any person should bring into this borough any diseased cattle or carcase, and that if they should submit such cattle or carcase for examination before exposing or offering it for sale, in case such carcase being held to be unfit for human food, that the said carcase should be condemned and destroyed. And in consideration of having submitted to such examination, such person should *not* be put to any further trouble about the matter.” While this rule has, to a considerable extent, put down smuggling, it has, on the other hand, increased the traffic in diseased cattle and carcases to such an extent, that I doubt whether there is a town in England where such an extensive and lucrative traffic in diseased cattle and carcases is carried on as in this town. There are a large number of butchers who make this their principal business, and who have men employed in going about the country seeking to purchase any quantity of diseased carcases. You can form some opinion as to the extent of the traffic from the fact, that since the commencement of the present year upwards of one hundred of such carcases have been submitted to me for examination PER MONTH, and for which I have had to find judgment.



The principal diseases among cattle are known to us as the “king’s complaint” (pleuro-pneumonia), epidemic, milk fever, quarter felon, dropsy, and the milt complaint, which I find you call splenic apoplexy, a disease which has been very prevalent, at certain seasons, in some pastures not far from the limits of this borough. I have had four cases of beasts slaughtered in this fearful complaint within the last three weeks. *Two* of the beasts were brought to this town to slaughter, and were condemned as unfit for human food. The third case was slaughtered at a farm-house a few miles from Leeds. The farmer brought the carcase to me for examination. It was a prime neat cow, and had been well dressed; however I condemned it, to the perfect astonishment of the farmer, who told me that he had given L.22 for it only four months before, and that I might as well have *robbed* him of as much money. I have known as many as eleven beasts which have died in one week from the effects of this disease. About three years since I went to these pastures, and I saw three beasts which had been slaughtered and dressed as for human food, hung up in an open shed, another lying dead in the fold-yard, and another lying dead in the pasture. These carcases being out of the limits of this borough, I had no jurisdiction; all that I could do was to prevent them coming into this town. They were bought by a butcher and carried to a neighbouring town, and sold for human food. I can fully confirm your statement,—“remove the spleen and the carcase appears sound.” The cattle generally attacked with this disease are beasts in good condition, and, if properly dressed by a butcher, could be sold at the most respectable butchers’ shops without much fear of detection.

The disease most common among cattle is pleuro-pneumonia, or, as our butchers call it, the “new delight.” This disease was unknown some twenty years ago, at least in this neighbourhood, and the farmers and graziers have suffered immense loss among their cattle by it. During the present year no less than 380 beasts affected with *this disease* have been sent to this town to slaughter, namely,—33 in January, 24 in February, 26 in March, 21 in April, 53 in May, 64 in June, 56 in July, 60 in August, and 53 in September. Those that were sent in the first four months belonged to cow-keepers and milk-sellers in and about the town, and I am sorry to have it to say, that some will milk their cows in this complaint so long as they can get any milk from them. The other and larger number were from the farmers and graziers from ten to fifteen miles of Leeds. They were mostly grazing cattle, which are apparently attacked with this disease just at the point when they begin to improve in condition. The immense number of such cattle attacked with pleuro-pneumonia would be almost past belief, were they not indisputable facts. I will give a few among the many cases that have come under my jurisdiction. Mr K—— of K——, told me one day, when I was examining a cow of his sent to slaughter, that that *one* made forty-one in *two* years, which he had lost in the complaint. Another farmer

had 73 head of cattle attacked with pleuro-pneumonia, 64 of which were sent to this town to be slaughtered, during the summer of 1862. This year, most of the cattle affected with this disease have come from the neighbourhood of Tadcaster and Wetherly. Mr H—— of G—— has sent 43. In June, the complaint broke out among a herd of 20 Scotch oxen which were grazing in a park; 13 of them were sent to Leeds to slaughter, and the other 7 were sold to a dealer, who took them to a southern market, thereby spreading the disease. Other farmers have lost—some as many as 10, 20, and even 30 each—by the same complaint. Doubtless you will be desirous to know what became of all these diseased cattle—what proportion of them was condemned as unfit for human food?

I am afraid that this portion of information will not be satisfactory, so far as regards pleuro-pneumonia, viz., that upon an average *one in six* is *condemned*, and in other diseases *one in three*. *Last year* I condemned no less than 382 carcasses of all kinds, and passed 673, making 1055 as the total number of diseased carcasses submitted to me for examination. But as this number includes sheep, pigs, and calves, you would not be able to form a correct opinion as to the number of diseased beasts which were allowed to go into consumption in the year 1862. In the total number above stated, were included 704 beasts, 554 of which were passed, and consequently went into consumption, and 160 were condemned and destroyed. In duty to myself, I feel bound to state, that I am far from feeling satisfied with such a state of things; but allow me to remind you of the very limited amount of information upon the subject of diseased meat, and its effect upon the human subject. In fact, the profession seems almost in total ignorance upon a subject so much affecting the health of the public. Here you have one of the principal causes of defective inspection: had I only *one professional gentleman in this town well up in this matter*, you may depend upon it Leeds would be the last place where any one would bring any diseased cattle.

I may here state, that last year the chairman of my committee, Mr Ald. Carter, and Dr Bishop, went to London to consult certain eminent professional gentlemen upon this subject, and the result was, that they did not consider it advisable to recommend any alteration in our mode of proceeding.

I will now suggest what it appears to me would prove the most effectual remedy for the prevention of the sale of diseased cattle or carcasses. The Nuisance Removal Amendment Act for this year is everything that could be desired, where attempts are made to expose for sale any such cattle or carcasses. But what is most wanted is a general supervision extending over the whole country. The farmers are now so accustomed to send away their diseased cattle to slaughter that they hardly ever think of attempting to cure them. It is a common saying, that the butcher's knife is the best doctor. I think they ought to be made to keep them at home, and put them under proper treatment; and for another reason, which I am sorry to say



prevails to a very great extent, namely, the practice which some farmers have of having diseased cattle slaughtered upon their premises for the purpose of either selling them to dealers, who hawk them about the country, or of sending the carcasses to the London dead-meat market. I know one farm-house in this neighbourhood, where no less than six diseased beasts (affected with pleuro-pneumonia) were slaughtered and dressed in one week, and were all sent to the London dead-meat market. The last reason which I shall advance is, that there are dealers who reside outside the limits of boroughs, who can carry on an extensive trade in diseased meat, without any fear of being disturbed. One of these dealers told me, that he could find a better market than Leeds for his diseased cattle, and that he had sent tons of diseased meat to London.

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*On the Ordeal Bean of Calabar.* By A. T. BRETT, Lecturer on Materia Medica, New Veterinary College.

THE bean and pea tribe (*Leguminosæ*, Jussieu; *Fabaceæ*, Lindley,) is a very extensive and important natural order, containing many plants yielding substances of great value to man in a dietetical, medicinal, and economical point of view, the properties of different species being exceedingly variable. Thus the bean, *Faba vulgaris*, and the pea, *Pisum sativum*, are so useful food producers, that they rank next in importance to the grasses (*Gramineæ*) from which our various bread corns are obtained. Timber, dyes, odoriferous substances, fibres, forage, &c., are obtained from other species, while many yield valuable medicinal agents; in proof of which I need only mention senna, catechu, kino, balsams of Peru and Tolu, copaiva, gum arabic, and gum tragacanth.<sup>1</sup>

But large as the list already is, the number of medicinal plants included in this order seems by no means to be exhausted; and but lately another has been added, which appears likely to occupy a prominent place—the *Physostigma venenosum*, from which is obtained the Esëřë nut, or Ordeal Bean of Calabar.

*History.*—This plant is found in Calabar and its neighbourhood, a district of West Africa bordering on the Bight of Biafra, where the seed is used by the natives for a special and peculiar purpose.

By the barbarous and grossly superstitious inhabitants of that region, every evil, real or imaginary, is attributed to the power of witchcraft. In accordance with such belief, any person may be accused by another of committing the crime, and to discover the innocence or guilt of the accused, recourse is had to a trial by ordeal, for which purpose the Esëřë or chop-nut is used.

The ordeal is administered in the most public manner, before the assembled inhabitants of the village where the charge is made, and

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<sup>1</sup> Gray, in his Supplement to the Pharmacopœia, enumerates nearly two hundred plants in this order, said to possess medicinal virtues.

under the direct superintendence of the chiefs or head men. The medicine man, priest or administrator, prays to the gods that the bean may have power to destroy the guilty; for they do not believe the bean in itself to possess any dangerous qualities, but simply to be an agent to which power can be given to show and punish guilt. The kernel, or an infusion of it, is then given to the accused in such quantity as the priest may think proper.

When nausea is produced by the dose administered, and vomiting follows, the accused is at once declared innocent, the sickness rapidly passes off, and a headache, which remains somewhat longer, is the only other annoying symptom.

In cases which prove fatal, the course is different: after the first few minutes, during which no particular symptom is felt, thirst sets in and soon becomes unbearable, the power of swallowing is lost, twitchings in the muscles (especially those of the back) occur, convulsions and death in about half an hour after the ordeal has commenced. During the trial consciousness is not impaired, neither is there delirium, and the power of speech remains until close upon death.

Should the accused successfully pass the ordeal, and be declared innocent, the accuser is liable to undergo a similar trial, to prove himself free from the same crime with regard to the other, which must act in some degree as a check on its already too frequent employment.

It was in consequence of the above curious employment of the *Esërë nut* that the attention of Europeans was first drawn to it, and it has continued to attract considerable notice from missionaries and others in the district where it is found.

The following is a list of the more important notices of it in this country.

In 1846, Mr Daniel, a physician, who had spent some time in Calabar, alluded to it<sup>1</sup> in a paper "On the Natives of Old Calabar, West Coast of Africa," read before the Ethnological Society, and published in the *Edinburgh New Philosophical Journal*.

In 1855, Dr Christison, Professor of *Materia Medica* in the University of Edinburgh, read a paper "On the Properties of the Ordeal Bean of Old Calabar, Western Africa," before the Royal Society of

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<sup>1</sup> "The king and chief inhabitants ordinarily constitute a court of justice, in which all country disputes are adjusted, and to which every prisoner suspected of capital offences is brought to undergo examination and judgment. If found guilty, they are usually forced to swallow a deadly poison, made from the poisonous seeds of an aquatic leguminous plant, which rapidly destroys life. This poison is obtained by pounding the seeds and macerating them in water, which acquires a white milky colour. The condemned person, after swallowing a certain portion of the liquid, is ordered to walk about until its effects become palpable. If, however, after the lapse of a definite period, the accused should be so fortunate as to throw the poison from off the stomach, he is considered as innocent, and allowed to depart unmolested. In native *parlance*, this ordeal is designated as 'Chopping nut.'"—*Edin. New Philosophical Journal*, vol. xl. p. 319.



Edinburgh, giving most interesting details of its history, properties, &c., and an account of several experiments with it, one of which nearly proved fatal to himself.<sup>1</sup>

On the 16th of January 1860, Dr Balfour, Professor of Botany in the University of Edinburgh, read also before the Royal Society of Edinburgh, "Description of the Plant which produces the Ordeal Bean of Calabar," giving a full description of the botanical characters of the plant, which he named *Physostigma venenosum*.<sup>2</sup>

In 1862, Dr Thomas R. Fraser gave an admirable inaugural dissertation "On the Characters, Actions, and Therapeutic Uses of the Ordeal Bean of Calabar," for which a gold medal was awarded by the University of Edinburgh, at the medical graduation of August 1862; to which we are indebted for the most extended examination of its properties and probable uses as a medicinal agent that has yet been made;<sup>3</sup> and,

In the present year, Dr Argyll Robertson, lecturer on Diseases of the Eye, Edinburgh, read a paper before the Edinburgh Medico-Chirurgical Society, on "The Calabar Bean, as a new Agent in Ophthalmic Medicine," describing a number of experiments illustrative of its action on the eye especially.<sup>4</sup>

*Botany*.—The following description and illustration (see p. 676) are taken from Dr Balfour's paper in the "Transactions of the Royal Society":—

Nat. Order, *Leguminosæ*; Sub-Order, *Papilionaceæ*; Tribe, *Euphascoleæ*.

PHYSOSTIGMA VENENOSUM; Ordeal Bean of Calabar.

*P. venenosum*.—The only species of the genus yet known.

A large twining plant, turning from right to left.

*Root* spreading, with numerous fibrils, often having small succulent white tubers attached. *Stem* about 2 inches in diameter at its thickest part, sometimes attaining a length of 50 feet, cylindrical, of a brown grey colour, roughish; younger branches of a dark green colour, thickened at the nodes; branches twisting on themselves, and round those in their vicinity; wood of the stem very porous, giving out, when cut, a pretty free stream of limpid fluid, which is slightly astringent and acid; woody bundles arranged in wedges; bark giving out a reddish, gummy exudation, which becomes very dark on drying. *Leaves* alternate, petiolate, stipulate, pinnately trifoliate; leaflets ovate, acuminate, each having a struma, which serves as a short petiolule, and two small, thickened, acute, and somewhat falcate stipels; lateral leaflets oblique at the base. *Venation* reticulated, curved veined, with a prominent midrib, and two less distinct lateral ribs. *Petioles* about 3 inches in length, rounded on the lower side, grooved on the upper, having a pulvinus, with two minute triangular stipules, which are reflexed, at the margins. *Inflorescence* axillary on pendulous multifloral racemes; rachis of raceme zigzag and knotty; knots rounded, irregular on the surface like minute tubers, bearing the pedicellate flowers. *Pedicels* about a quarter of an inch in length, two or three arising from the same nodosity, from which they separate by disarticulation; flowers articulated to the pedicels; at the upper part of the pedicel, close to the flower, are two callosities representing brackets, and sometimes a sort of thickened ring. Flowers about an inch in length, half an inch

<sup>1</sup> Monthly Medical Journal, vol. xx. p. 193.

<sup>2</sup> Transactions of the Royal Society of Edinburgh, vol. xxii. Part i. p. 305.

<sup>3</sup> Edinburgh Medical Journal, 1863, Nos. xcvi. xcvi. xcix.

<sup>4</sup> Oliver and Boyd, Edinburgh.





DESCRIPTION OF CUT (*Physostigma venenosum*).—Fig. 1. Branch with pinnately-trifoliate leaves, and nodoso-racemose inflorescence, showing also entire flowers with persistent calyx and young legume. 2. Vexillum separated. 3. Alae. 4. Carina. 5. Diadelphous stamens. 6. Upper part of bearded style, with cucullate stigmatic hood laid open. 7. Upper part of bearded style, with cucullate stigmatic hood laid open. 8. Calyx and young legume. 9. Young legume of *Physostigma venenosum*, with three ovules. 10. Full grown legume of ditto. 11. Seed of the Ordeal Bean seen laterally. 12. The same, showing the sulcate and extended hium on the convex edge. All the figures half natural size except 6, 7, 8, which are larger.



across. *Calyx* campanulate, four cleft at its apex, the upper division being notched, and its segments ciliated; the calyx is thus composed of five united sepals, and it assumes a somewhat bilabiate appearance. *Corolla* papilionaceous, beautifully veined, of a pale pink colour, with a purplish tinge, when preserved in spirits, assuming a pale yellowish hue, curved in a crescentic manner. *Vexillum* external, large, completely covering the other parts of the flower in æstivation; bilobate at the apex, which is completely recurved, narrowed at the base, with two small projections on each side of the very short claw which is furrowed, and has two longitudinal callosities in the middle; basal portion of limb of vexillum having rounded lobes, which are turned inwards, so as nearly to meet. *Alæ* large, more deeply coloured than the other parts of the flower, reaching to the edges of the vexillum in bud, obovato-oblong, curved, narrowed into a curved hook-like claw, with a projection above it, edges slightly incurved. *Carina* as broad as the alæ, and much longer than them, equal in length to the vexillum, broad below, prolonged upwards into a narrow sort of rostrum, which ends in a blunt apex, and is curved upwards and backwards, so as to form between two-thirds and three-fourths of a circle; petals of keel ovate-oblong, with triangular acuminate processes projecting from above their base on the inside, and with very narrow claws. *Stamens* ten, diadelphous, nine united by their filaments for about two-thirds of their length, vexillary free stamen an inch and a quarter long, with an appendage to the filament immediately above its base; staminæ sheath swollen below, filaments long, not thickening upwards; anthers two-lobed, dehiscing longitudinally. *Disk* at the base of the ovary thickened, with a sheath extending upwards over the gynophore. *Pistil* more than one-and-a-half inches long; ovary stipulate, rough on the surface, not hairy; style curved, smooth, except below the stigma, where the concavity is covered with a continuous line of hairs, which give a marked barbate appearance; stigma blunt, covered by a remarkable ventricular sac or hood, which extends along the upper part of the convexity of the style. *Ovules* two or three attached to the ventral suture by a broad process, crescentic in form, with a convex placental edge, and a long hilum. *Legume* in the young state green, and somewhat falciform, afterwards becoming dark-brown and straight; sutures slightly prominent, ventral one grooved, interior lined with white loose pith-like cellular tissue, in which the ovules are imbedded, and by which they are separated from each other. Full-grown legume about seven inches in length, elliptico-oblong, with an apicular curved point, stipulate (stalk about an inch in length), dehiscent, outer integument (epicarp) separating from the inner, dark-brown, rugose, marked with anastomosing fibres, which run partly in a transverse direction, and partly along the edge of the pods. Inner covering (endocarp) of legume, pale-coloured, and roughish externally; ventral suture furrowed. *Seeds*, two or three, about an inch long, three quarters of an inch broad, each weighing from forty to fifty grains, separated from each other by a woolly cellular substance; hilum dark, sulcate, with brown elevations on either side, extending along the whole convex placental edge of the seed; other edge nearly straight; cotyledons pale, hypogeal.

*Habitat, Old Calabar and adjacent district.*—The plant is perennial, climbing on bushes and trees, growing on the banks of rivers and streams, preferring and thriving best in swampy places; its fruit, which ripens at any time of year, is most abundant in the rainy season, from June to September.

It has been successfully cultivated in the Edinburgh Botanical Gardens.

The seed is the only part of the plant which seems to possess medicinal powers.

*Synonyms.*—Ordeal bean of Calabar, Esěř nut, chop nut, bean of the Etu Esěř.



*Description.*—Irregularly kidney-shaped, having a sulcus or groove along the convex margin, externally it is covered with a tough, hard, brownish integument, varying in shade from light-greyish or reddish-brown to nearly black; internally it is cream-coloured, and is easily scraped or pounded. The average length is a trifle over an inch, average breadth about three-fourths of an inch; the average weight is about sixty grains, and the specific gravity slightly less than that of spring-water. Its taste is very like that of a haricot-bean, “without bitterness, acrimony, aroma, or any other impression on organ of taste,”—a peculiar and dangerous quality, very apt to mislead, as the poisonous seeds of the Leguminosæ are, excepting itself, bitter to the taste. Another peculiarity is, that they are never injured by insects, a rare occurrence with tropical seeds.<sup>1</sup>

*Chemistry.*—According to Professor Christison, the seed contains much inert starch and legumine, 1·3 per cent. of fixed oil, probably inert, and its active properties may be concentrated in an alcoholic extract which constitutes 2·7 per cent. of the seed. Hitherto the active principle has never been isolated, and, although probably an alkaloid, is absolutely unknown.

*Pharmaceutical Preparations.*—In addition to the powdered kernel, the preparations used by Dr Fraser were a tincture and an extract. The following are formulæ for them:—*Tincture*: Take of the kernel in fine powder ʒi, rectified spirit ʒij, place the kernel and one ounce of the spirit in a carefully covered vessel, and allow it to remain for forty-eight hours. Pack in a percolator, pour in what spirit may be left in the vessel, and add the remaining ounce of spirit. When this has ceased to escape from the percolator, pass as much more spirit through as may be required to obtain two ounces of a golden-yellow tincture. Five minims of the tincture, so prepared, appear to be equal to three grains of the kernel. But such a proportion of spirit as that used does not exhaust the kernel.—*Extract*: Powdered kernel ʒi, rectified spirit ʒxij; distil off about eight ounces, and evaporate the remainder, first to a syrupy consistence in a vapour bath, then, by spontaneous evaporation, twenty-one grains of an extract may be obtained. It has a deep-brown colour, a peculiar sweetish and disagreeable odour, and considerable consistence.<sup>2</sup>

Another preparation mentioned is made by acting with one drachm of distilled water on five grains of firm extract, representing 120 grains of the kernel, one minim of which possesses the activity of two grains of the kernel. This preparation is inelegant, as a large portion of the extract is not dissolved, and renders the fluid muddy.

Preparations made with water have not succeeded.

*Physiological Actions.*—Our knowledge of the physiological action of the ordeal bean on the animal system is chiefly derived from a few experiments by Professor Christison, and from Dr T. R. Fraser's

<sup>1</sup> Christison, *op. cit.*

<sup>2</sup> Dr Fraser recommends the extract in its syrupy condition for ophthalmic purposes, and used it largely in his physiological investigations.



extended investigation, embracing a series of experiments on various animals, such as the rabbit, dog, cat, guinea-pig, birds, frogs, &c., in which the nutritive, respiratory, circulatory, and nervous systems, the muscular, serous, and mucous tissues, were all made the medium on different occasions for the introduction of the agent into the system, the only effect of which was a varying degree of rapidity in the development of the symptoms, on which seems to depend some difference in their character.

*On Vegetables.*—The infusion of the powdered kernel, except a sedative effect on some plants, does not appear to exert any baneful action on vegetable life. Infusoria are developed in it as in ordinary vegetable infusions.

*On Animals.*—The effects vary with the amount given: a small quantity, but sufficient to destroy life, produces first tremor and then paralysis of the extremities, commencing with the posterior limbs, and extending forwards to the anterior extremities and head, involving the whole voluntary muscular system; the respirations become slow, irregular, and stertorous. The pupils contract, frothy mucus escapes from the mouth, and evacuation of the bowels sometimes happens, twitches occur in the flaccid muscles, especially affecting those of the extremities, respiration becomes more gasping, and death follows.

Consciousness does not seem impaired, and before the paralysis is complete, proofs of sensation can be educed by irritating the skin, but towards the end reflex action entirely ceases to be manifested.

When larger doses are given, the effects follow with more rapidity, the muscular system of the animal almost immediately fails, and, excepting a few twitches, is motionless, flaccid, and paralysed. The pupils are contracted, fluid escapes from the nose and eyes, and with a few gasping breaths, death supervenes.

In both instances the pupils dilate immediately after death, and if the quantity of the poison administered was small, the contractile power of the muscles and the heart is retained for some time after death; but when the quantity given is in excess, the muscles immediately cease to contract and the heart to beat; its cavities are distended and full of blood, a distinct difference in the colour of their contents is noticed, the blood on the left side being much brighter in colour than that in the right side.

The *post mortem* appearances differ somewhat according to the size of the dose administered; after small quantities of the drug, there appears to be pretty universal signs of venous congestion, the lungs, liver, and kidneys being engorged, and the surface of the brain injected, and dark in colour; the fauces contain frothy mucus, and the back of the tongue is injected. The spinal cord and the digestive canal appear normal, but with excess of fluid in their serous cavities.

From large doses the appearances of the various organs and viscera remain much nearer that of their ordinary healthy condition,

but the colour of the blood in the different systems of blood-vessels is well marked and readily distinguishable.

To illustrate the differences attempted to be described above, the following experiments by Dr Fraser, and which are taken from his paper, will be found useful:—

“EXPERIMENT 8.—Five and a half grains of the fine powder of the kernel were made into pills, and swallowed by a buck rabbit eight months old.

“A slight degree of paralysis was seen in the posterior regions in ten minutes, and, soon after, they yielded, the anterior portion of the trunk remaining supported by the fore-limbs.

“In fifteen minutes the fore-legs gave way. Fæces were passed. In twenty minutes the respirations became noisy, reflex action was unimpaired, and the pupils contracted. In thirty minutes, the rabbit submitted to be placed in any position. In thirty-five minutes, the respirations became extremely noisy and accompanied with muscular spasm. Fæces and urine were passed, and reflex action could not be induced by puncturing the skin. General, but slight, muscular spasms now occurred frequently; the eyelids did not contract when the eyeball was pricked, and the respiratory stertor ceased. In forty minutes, a general spasmodic contraction of the muscles occurred; and, in forty-one minutes, all respiratory movement had ceased.

“*Autopsy—immediate.*—The cut muscles contracted. The heart was acting seventy-two per minute, and this ratio gradually diminished till it ceased, thirteen minutes after death. The brain was rather darker than usual, and no change could be perceived in the spinal cord. The cerebro-spinal fluid was in abnormal abundance. The large veins were distended. The right chambers of the heart were engorged with black blood; the left ventricle was empty, but a little black blood was found in the left auricle. A considerable quantity of fluid was present in the abdomen, and the vermicular action of the intestines was well marked. All the viscera contained an abnormal excess of blood of a dark colour. The muscular system was extremely flaccid, but contractions could be caused by irritation of the nerves.

“*Remarks.*—This experiment formed one of a series undertaken to discover the smallest dose which could produce death in a full-grown rabbit. A number of rabbits, as nearly as possible equal in age and weight, were selected, and a series of doses was given, commencing with four grains, and increasing at the rate of a quarter of a grain. Five and a half grains, as in the present instance, was the smallest quantity of the kernel which produced death.

“EXPERIMENT 14.—Five minims of syrupy extract were injected into the right thorax of a young rabbit, by means of Wood’s hypodermic syringe. This was done in such a manner that the pleura was punctured, and the pulmonary structure reached.

“The rabbit was perfectly quiet for seventy-five seconds, when it endeavoured to jump away and stumbled. In one minute and a half the fore-legs yielded, and the animal fell; and, immediately afterwards, the posterior extremities were paralysed, and it lay extended in a flaccid condition. The pupils became contracted. Irritation of the eyelids or eyeball did not produce closure of the eye. A few jerks occurred in the hind-limbs. General muscular quivering accompanied, and could scarcely be distinguished from, the respiratory movements, and these ceased in two minutes after the administration.

“*Autopsy—immediate.*—The heart was passive, distended, and contained red blood in the left chambers, and dark blood in the right. The vermicular action of the intestines was very slight. Feeble contractions followed irritation of the phrenic and sciatic nerves. The other various organs and viscera were normal.

“EXPERIMENT 15.—The trachea of a full-grown rabbit was exposed, and cut open a short way above the sternum. Five minims of syrupy extract were allowed to run down the trachea towards the lungs, in a gentle stream, from the needle point of Wood’s syringe.



“As soon as the rabbit was liberated, it ran a few steps, then stumbled, and, in forty-two seconds, fell down. The pupils contracted, and irritation of the eyeball did not produce winking. A few gasps and slight muscular tremors occurred, and in two minutes all respiratory movement had ceased.

“Autopsy—*immediate*.—The heart was passive. Irritation could produce a slight, wavy, muscular action for ten minutes. When incised, black blood was found in the right side, and scarlet in the left. The vermicular action of the intestines was extremely indistinct. The stomach and bladder were distended. The arterial and venous systems appeared normal, and their vessels filled without distention.

“No inflammatory change was discovered in the trachea or bronchi, but a distinct odour of the extract could be perceived over a great portion of both lungs. There was no congestion of the pulmonary texture.”

*Topical Action*.—When an active preparation of the bean, as the alcoholic extract, is applied directly to a part such as a voluntary muscle, or the parietes of the heart, the contractile power is impeded or entirely lost; if to a portion of the intestinal tube, the peristaltic motion almost immediately ceases in that part; when it is applied directly to an eye, it causes contraction of the pupil in that eye, as when internally administered it causes contraction in the pupil of both eyes.

The conclusion almost forced upon us by the above facts is, that the Ordeal Bean is an agent possessing powerful depressing properties, acting specially on the spinal cord, and manifesting itself directly in paralysis of the voluntary muscular system, and indirectly through the sympathetic system, by reduction of the organic forces generally—the heart showing such influence in a marked degree.

The contraction of the pupil also may be considered as giving valuable evidence for the same conclusion, for the radiating muscular fibres of the iris, upon which depends the dilatation of the pupil, are supplied with nervous influence from the spinal cord through the sympathetic system, and the circular fibres of the iris serving to contract the pupil from the cerebral nerves. This being admitted, when the nervous supply from the spinal system is impeded or stopped, the antagonistic influence from the cerebral nerves would obtain undue power, and contraction of the pupil necessarily result;<sup>1</sup> and this we find to be the case from the action of the ordeal bean, whether applied directly to the part, or through the general system.

Dr Fraser sums up as follows:—“We may therefore conclude, that the kernel or embryo of the bean of *Physostigma venenosum* has the following actions:—

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<sup>1</sup> One of the most remarkable cases of a definite motion uniformly excited through the sympathetic system, is the dilatation of the pupil, which after many imperfect attempts to determine its source, has now been shown by the experiments of MM. Budge and Waller to be effected through the cervical portion of the sympathetic. For whilst irritation of the trunk of the cervical sympathetic, by means of the magneto-electric machine, produces dilatation of the pupil with just as much certainty as irritation of the third pair determines its contraction, section of that trunk occasions permanent contraction of the pupil, the action of the third pair being no longer antagonized.—*Carpenter's Principles of Human Physiology*, p. 863.

"1. It acts on the spinal cord by destroying its power of conducting impressions.

"2. This destruction may result in two well marked and distinct effects—

"a. In muscular paralysis, extending gradually to the respiratory apparatus, and producing death by *asphyxia*.

"b. In a rapid paralysis of the heart, probably due to the extension of this action to the sympathetic system, thus causing death by *syncope*.

"3. A difference in dose accompanies this difference in effect.

"4. This action does not extend to the brain proper *pari passu* with the action on the spinal cord. The functions of the brain may, however, be influenced secondarily.

"5. It also produces paralysis of muscular fibre, striped and unstriped.

"6. It acts as an excitant of the secretory system, increasing more especially the action of the alimentary mucous glands.

"7. Topical effects follow the local application of various preparations; these are,—destruction of the contractility of muscular fibre when applied to the muscles, and contraction of the pupil when applied to the eyeball."

*Therapeutics*.—Up to this time, too little is known for us to form a decided opinion of its value as a curative agent. Dr Fraser has found it serviceable as a sedative, in the human subject, in cases of erysipelas, delirium tremens, acute bronchitis, rheumatic fever, &c.; and, from its special physiological action, it promises to be a valuable agent where there is excessive sensibility, or irritability of the spinal cord, as in tetanus and some forms of convulsions; and it may yet prove highly useful as a nerve sedative, in various ways, and also as a means of controlling the heart's action.

*Topically*.—Its value as an ophthalmic agent may be considered as established; the experiments and researches of Dr Argyll Robertson and Dr Fraser are conclusive on this point. Its application to the eye causes rapid and permanent contraction of the pupil, the action being directly antagonistic to that of atropine and belladonna, which has long been a desideratum in ophthalmic medicine.

The supply of the bean is at present extremely limited, and must be so for some time, if, as according to the Rev. Mr Waddell, "the plant is everywhere destroyed by order of the king, except where it is preserved for supplying the wants of justice, and that the only store is in the king's custody."<sup>1</sup> Still, if further experience should confirm the great promise it gives of being a valuable addition to our materia medica, there is little doubt means will be found to increase the supply, and more opportunities will be afforded to veterinarians of testing what amount of service may be made available from it, in their own range of practice.

<sup>1</sup> Christison, *op. cit.*



## REPRINT OF REMARKABLE MEMOIRS.

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*The Breeding of Hunters and Roadsters.* By JOSEPH GAMGEE, Sen.,  
Professor in the New Veterinary College, Edinburgh.

(From the Journal of the Royal Agricultural Society.)

## PRIZE ESSAY.

(Continued from page 612.)

ONE important point in which the rearing of horses at the present day differs from the practice of the last century, consists in the small paddock and artificial forcing management being substituted for the range of the spacious park, with the necessary adjuncts, until maturity was reached.

Amongst the essential conditions for breeding horses, next to that of selection of stock to breed from, is the choice of the land as regards its nature and extent; to this point too little attention has been paid of late, and it has a special importance in the case of hunters, because they require longer time in pasture than others, to complete their growth and consolidate the frame.

When the subject of rearing horses on farms which contain little or no pasture has been under discussion of late, and the relative cost of a young horse produced *in the farmyard*, has incidentally been contrasted with that of one purchased of the same age, it has been argued that the price of the horse bred on the farm is not felt like the payment of all the money in a lump. It is strange that men of the sagacity of farmers should make any such exception to the broad commercial rule of exchange, which never applies more forcibly than in this case.

The first question for a man to ask himself who has a desire to breed horses, is,—have I the necessary pasture-land for the purpose? Without this nothing can be done in the matter; with it and the necessary capital everything can be accomplished. Good sound old pasture is that which admits of the best hunters being produced with the least help by artificial means; such land as grows the best wheat seems also to suit horses well—the North Riding of Yorkshire may be cited as a case in point. Well-drained land is essential, and a dry surface most favourable,—whilst wet, flat lands may grow grasses and feed horses to a large size, hunters can never be produced on any other than good firm soil; if the surface be hilly, all the better; if some of these natural advantages be wanting, yet horses bred on sloping ground, where they have variety of exercise, become finer in form, with better action, than when bred on flat ground.

Many of the best horses known at all times have derived their high qualities from the physical character of the ground on which they were bred; the more extensive and diversified this is, the less risk there is of foals breaking a leg whilst galloping and playing in a confined paddock,<sup>1</sup> an accident which has repeatedly happened to those confined in small space, which are highly fed, by which weight and muscular energy become developed in excess of the consolidation and strength of the shank bones, which are mostly tired in the use, and are those which soonest give way. I never knew of a similar occurrence where the young animals have had space and inequality of ground to give them strength, with the will to use it.

With a regular supply of good sound food, horses may be bred to a very high state of perfection on dry poor soil; so far it is a question of expense. I have seen horses bred on inhospitable ground, and there left to nature, which, after care has been taken to get them into condition, have become serviceable animals; but a horse bred on swampy ground, or confined in a soft, wet, filthy farmyard or stable, may grow large and heavy, as they generally do, but can never be good for any purpose. Fine shape, good action, compact textures, with sound constitutions and feet, such as will bear exertion, are requisites pre-eminently required in the hunter, and no class of horse should be without them, to the highest attainable degree; yet none of the above qualities can be acquired unless foals and growing colts have liberty on firm ground: this proposition is based on some of the fundamental laws of nature which cannot be violated with impunity.

The experience afforded by other nations confirms this view: thus France, having few natural advantages, purchases horses for common use from Germany, and has recourse to England for choice specimens of valuable breeding-stock; Northern and Central Italy obtain their horses from the same sources. Even in England horse-breeding is in great measure confined to some of the more favoured counties, where the best can be reared at the least outlay for artificial means.

On some of the extensive tracts of land which belong to the Roman States, horses may be found under conditions which approximate to their purely wild state; within certain bounds they range and breed as free as the deer of the place, stallions and mares running together, *i.e.*, a stallion is selected for the season, and turned loose with a certain number of mares; the market value of young unbroke horses, when so reared, depends greatly on the character of the ground; whilst colts bred on high land will fetch 300 crowns the pair, those reared at the distance only of a few

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<sup>1</sup> Allusion is made to these incidental casualties which occur where the conditions for giving strength of bone and equality of parts are imperfect, to illustrate a doctrine opposed to the prevailing custom of confining young stock to little space. Where excessively fed, great weight and early development are attained at the cost of more requisite qualities.



miles on low, soft, marsh land will realise only 50 or 60 crowns a-piece. Wherever the matter has been tested, I have found that the character of the soil and general management influences the wearing powers of horses than that of their parentage.

Where attempts have been made on the Continent to breed horses in small enclosed paddocks, such as in England are allotted for blood-stock, without the aid of the English soil, climate, &c., it has always proved a failure; the stock have been high on the leg, narrow, and without form, action, or good qualities of any kind. Where, however, the English stallion is used, and the mares have their native freedom on good ground, relatively good stock has been procured.

Change of ground is good for horses, for the fresh soil and herbage it presents, as well as for the variety of surface it affords. Land laid down in seeds, though inferior to old pasture, is often serviceable to the farmer as affording an extensive range of fresh ground.

It is not until the second summer that colts require more extent of ground than a small enclosed field affords; the young animals, if they have only an acre of space, will display their speed by galloping round their dams in a circle. Colts and fillies destined to make hunters, require to have their liberty for three full summers; and it is a question to be settled by the means at hand, whether four summers should not be given. Hunting-colts should be taken up, broken, and be gently ridden at latest during the winter when they are rising four years old; they may then either be turned out again for two months during their fourth summer, or be ridden over the farm at that time, which, with a good rider and proper care, affords the best beginning for a young hunter; such usage is preferable to turning out, though both these courses may be followed in the same summer, to some extent, with good effect.

It is not necessary that the space of ground allotted to mares and foals should furnish all their sustenance during any considerable part of the year; most breeders of hunters, however, will be provided with such good grass-land as will make them independent of much other aid during three or four months of summer. To a great extent, the same system that is adopted for the racing-stud may be carried on in breeding hunters; but the practice of running blood-horses at two years old has induced breeders to stimulate their growth and development by free and, I may say, excessive feeding.

To insure the best results, there is only one mode of procedure for different stock as far as the first and second summers, with the intervening winter, go. Whether the colt be entered to run for the greatest early stakes, or destined to carry the heaviest amongst the fastest of riders to hounds, or designed to make a stallion, ample space on good land, shelter and cleanliness, are essentials,

without too much pampering ; the food to consist of sound meadow hay and oats, to such an amount as the resources of the land and the state of the animal indicate. Growth, form, and fine fibre are our requirements in the horse ; and it is by giving food of a kind and quantity which can be assimilated that these are produced ; any excess in the quantity of food given adds to bulk and weight, at the expense of quality.

Thoroughbred foals and yearlings, under the present method of feeding, eat from 1 peck to  $1\frac{1}{2}$  peck of oats per day ; and of hay, either cut into chaff or in its normal state, about 7 lbs. The motive for this, as I believe, excessive feeding, is not alone the prospect of the young stock being put into training at eighteen months old, but especially that of their being previously offered for sale. The object of primary importance, that of producing the most symmetrically formed horse, is thus made subordinate to the desire of turning out the largest yearling colt.

I am of opinion that if the quantity of corn given to some of the blood-stock was diminished to three feeds daily (a change which would induce them to eat a larger proportion of hay), their condition would be thereby improved, even for the time, and more obviously so for the future. What is required in the colt is thorough development of the muscular and nervous system, and of those organs which carry on the functions of nutrition ; a little fat will be stored up, according to the natural law, but young horses should never be made up until they are what may well be called “beastly fat.” To be liberally fed, so that there is no interruption to growth, their appetites and condition should be carefully watched, and the distribution of food regulated with judgment.

I disapprove of green food, such as vetches, clover, and other grasses, cut when in season, and given in large quantities to horses of any class. Green forage so given has few of the properties which it possesses when horses eat it off the ground as it grows. In his normal state, the horse selects and masticates, so that the process of feeding is slow. Mown grass becomes first *weltd*, then ferments, is stalky or woody, and when placed before horses under restraint, it is eaten voraciously ; the stomach and bowels becoming overcharged, digestion is impaired. All grasses should be either eaten off the ground, or else, when cut, made into hay, whereby time is given for the consequent fermentation. When I make any exceptions to this rule, I am very careful as to the kind of grass, and its state when cut—it should be at the point of flowering ; and the quantity supplied must be small on the whole, and nicely apportioned between different baits. These statements are meant rather as cautions than fixed rules. In town, the ill effects of giving green food are most marked, because there it is commonly given in an unfit state, through the causes alluded to. The same objections do not apply to roots, amongst which carrots especially form an excellent adjunct to good oats and hay during a great part of the year, for mares and young



stock of different ages. Scientific researches into the chemistry of food have not done much to modify the sound rules of practice long established in England on the feeding of horses. In 1860, the Cleveland Agricultural Society set the example of giving L.100 to the best thoroughbred stallion for getting hunters; and the Royal Agricultural Society, by offering a like prize at its three last meetings, with similar conditions attached, has afforded further scope to the experiment, which has not as yet shown the promise of much fruit. Indeed, there now appear some signs, if not conclusive evidence, to show that not only no good end is likely to result, but that this large prize tends rather to defeat the object for which it was so liberally set on foot. Without some annexed conditions, no guarantee is afforded that the recipient of the money uses his horse so as to make him available for the breeders of hunters and roadsters. The large prize has either fallen on a horse of high renown, which was serving mares at a fee such as none but breeders for the turf can afford to pay; or else it has been given to a young horse which should have won his way to favour gradually by his merits, and thereon the price for his services is increased to an amount which places him quite beyond the means of breeders of hunters.

Unconditionally as this prize is given, any one of the renowned stallions which covers at from L.10 to L.50 may be walked to the yard and obtain the prize, thereby deterring the owners of more eligible horses from going to the expense and trouble of bringing them to encounter defeat. The line of distinction drawn between the first prize-horse and his competitors is frequently also too broad; and this leads to discontent and complaint against the decision of the judges. The tendency of this prize, then, seems on the whole to be rather to deter than encourage the keepers of really useful country stallions. Indeed, it may be questioned whether the whole system of awarding prizes to stallions by the local agricultural societies of England for some years past has not tended to exhaust the means for procuring a good horse.

Prizes, when given without restrictive clauses, act as an advertising medium, to such an extent that the prize-horses of one year have very rarely been found in England the next season; and as premiums are usually given at the age of three and four years, the animal has been of little service prior to exhibition and sale: prize-mares go abroad as well as stallions; so there are few good mares to breed stallions from, and still fewer good stallions to get fillies.

It must be acknowledged that the blood-stallion has not been so much affected by these measures as the half-bred horse; whilst in the cart-horse class the system has worked well, inasmuch as there is little demand for them on the Continent; and the Scottish Agricultural Societies, particularly, take care that the horses, according as they obtain first, second, and third prizes, shall be located in such districts as the Society directs; and if the same course had been followed in Yorkshire and other districts in England, our beautiful

nag-sires would have been retained for at least one season after their excellences had been publicly proclaimed.

In judging the classes of hunting and roadster or nag-mares, some more intelligible definition than has generally prevailed is wanted. Yet so closely do these blend one with another, that it is difficult to draw a line, so as to divide them into even two classes; there should, however, be a clear distinction between the hunting and the thoroughbred mare: the latter, if good, is kept to the paddock, and in a general way never becomes the producer of hunters. Moreover, the same objection applies to the mare as to the high-class blood-stallion; they can be walked into the yard simply to receive the prize; the racing-stud would furnish mares such as the dam of Kettledrum, which would carry off the prize, thereby deterring farmers from producing their best, and, moreover, set a wrong example, stamped by authority, as to the kind of mares which farmers should try to keep.

I may refer to an instance in point as an example; at the East Riding Agricultural Show, held at Bridlington about 1853, I saw the first prize for the mare for breeding hunters awarded to Hygeia, by Physician; that mare had never been out of the racing-stable or the stud. She had bred runners, but nothing like a hunter; and has since been remarkable for becoming the great-grandam of Dundee.

Exhibitions of foals with their dams at local agricultural shows afford encouragement for breeding, and also the first and best means of bringing good stallions into early favourable notice.

There are objections to awarding prizes to gelding-colts at various ages, either as hunters, nags, or carriage-horses: in the first place, the breeder has encouragement enough in the probable price he will realise for a good colt; but a second and more positive objection is, that good colts are so pampered by feeding, and by being kept up in the stable, that they seldom turn out good for much afterwards; and here, again, the open system of giving prizes has led to the colt being taken from place to place; whilst a wise farmer with a really good one would not enter into competition of fat against form, a pampered horse against a well-kept and level-formed one, gradually growing into worth.

Whenever prizes are given for horses, the judges should agree to take into account the use for which that animal is required; and when made as fat as a Christmas ox, horses should be disqualified from competition as much as if they were pronounced unsound by a veterinary surgeon.

The scarcity of good blood-stallions, available for farmers, at reasonable charges, is proverbial; and yet good horses in no small numbers are produced annually: how these can be obtained as stallions seems to be the question, subordinate only to that of a right understanding of the extent to which they should be employed, and of how to select the good and avoid the bad.



On the rules and regulations of the Jockey Club, from time to time, in force, will depend the extent to which good blood-stallions can be obtained, since the temporary failure of our supply is in great measure referable to running our horses at two years old. I distinctly use the word temporary, because I do not believe that any radical or general deterioration has taken place. If two-years-old engagements were carried over to the third year, and the more real tests of power and lasting qualities left to be decided at four, the character of the blood-horse would at once greatly improve, and more would be available for stallions without necessarily more being bred. By such reform the forcing of colts would be checked; indeed, it would be incompatible with success, since protracted accumulation of weight would prove an incumbrance. Under a less hurried management, young stock would acquire as much good form as under the present system before being disposed of, besides the larger proportion of them which would be developed into useful horses, of which many are now destroyed before they have had a chance of showing what is in them.

Modern steeple-chasing has drawn heavily on the supply of blood-horses adapted for country stallions; that sport, which formerly was intended to be a test for good riders across country, and also of the clever hunter, has to a great extent been the means of calling out the indifferent race-horse to beat the horse really fit to be ridden to hounds. Many good powerful blood-horses have consequently been converted into geldings, which, as stallions, might have begun in the lower ranks and reached the highest.

The next and most considerable draft from racing stock is that carried off by exportation; this affects our means of obtaining stallions to get hunters, because the better class of horses are selected—those that have run, have stood their work, and are of good size, and sound. Amongst those horses which annually leave the country, are some equal to the best of those left behind. It may be excusable to point to some inconveniences (though the remedy is not so readily seen); because until the influences in operation are shown, remedies cannot be instituted. Blood-horses fit for country stallions are from the above causes much higher priced now than formerly, hence the scarcity of them amongst country stallion-keepers. Some of the best blood-stallions in England formerly travelled in Yorkshire, serving country mares at two guineas each, and the owners made a good business by the number of subscriptions obtained; an attempt should be made to open up this channel again. What are called tried stallions are not wanted for this purpose; there are always young blood-horses in various localities, advertised to serve mares at ten guineas each, which do not pay their way; yet these, if properly appreciated in a breeding district, would get plenty of mares. Horses so employed have fully as much chance to obtain some blood-mares as if they were kept at more important centres, where those

of established repute stay. Brutandorf was serving mares at two guineas each, in the East Riding, when one of his sons, "Physician," was the first young stallion of his day, and another, Hetman Platoff, one of the best horses in training. The owner of Brutandorf did his business well, over a succession of seasons, in the same district ; and when the horse was about twenty years old, he was sold to go to Russia, for nearly as many hundreds of pounds.

The wintering of mares and foals calls for little special notice in studs which are well provided with shelter, and paddocks for exercise. Farmers, however, can only adopt such measures as are essential or least inconvenient ; and although individually they may have only two or three mares, still on them we are dependent for the greater part of our general supply. In their case the farmyard is commonly made the receptacle for stock indiscriminately, when the field affords neither food nor shelter. There is a commonly prevailing notion that wet about horses' feet and legs is either good, or not injurious. Nothing can be further from the truth. Without discussing the relative value of open and covered farmyards, I may state that a wet farmyard is most injurious to horses. A small home-field, with a dry soil, is of the greatest use to turn the young horse-stock into daily. Shedding can be made temporarily in fields distant from home by means of upright posts, across which smaller timber or rough materials may be placed, to be covered with furze, reeds, haulm, and such-like material, and finished off with thatch. Such a shed for mares and foals or young growing colts will be as comfortable and as conducive to their health as the most elaborate building. Care must, however, be taken that the site is dry and free from all accumulations of wet, nor should these animals be allowed to stand upon an accumulation of dung, but their sheds should be as clean and dry as a well-kept stable. Those rules are not less applicable to permanent buildings ; firm, clean stone bottoms are the best surfaces for horses to stand on ; these should be thinly covered over with clean straw, which should be changed and the floor swept daily.

Breeders of hunters require to be, as they mostly are, good judges of horses generally, that each animal may be assigned to his proper use. When a colt is growing large and coarse, more like a coach-horse than a hunter, it is well that this should be seen in time, before extra expense is incurred, when perhaps the proper time for sale would be passed over ; though good horses often run in families, there is nevertheless frequently great diversity, even in horses that are full brothers.

Hunters of the greatest power, and the best performers under heavy weights, are usually about 16 hands high ; and some geldings exceeding that height are very well-formed animals, and have good action. Most experienced riders, however, who are in possession of a very good large horse, will be able to tell of one that could carry them quite as well which measured a hand less : my own experience



is against high horses ; hunters of from 15 to 16 hands high may be equally good for different weights from 11 stone upwards.

Some of the questions which most perplex men in trying to understand the relative merits of horses from their sizes, shapes, and general external appearance, could be reduced to more simple rules, if action were better understood than it has been. Excellent judges of both form and action are to be found who yet, from want of some fundamental rules, are unable to connect the one with the other. Hence the fine form of a horse is not appreciated until after he has performed some feat ; and, since the value of the horse turns principally on his locomotive power, the art of breeding and rearing hinges on a right appreciation of action, which is the representation and offspring of form.

When horses like Little Wonder and Daniel O'Rourke, that were sensibly under 15 hands high, are seen to outrun horses of 16 hands for the Derby, it is generally thought that the little horse has gained over the larger, through his quicker movements ; that more strides must be taken in the one case than the other ; or else that the lower horse keeps up the pace the longest, as is really the case, the larger horse being the weaker. But as regards the length of stride, the notion of the little horse having the shorter is very probably wrong ; and when he has beaten the larger animal, it generally is by his length of stride ; and the same construction which gives that faculty, confers the power to keep it up.

The eye is the best guide to the form of the horse. Like the sculptor and painter, we cannot proceed far by measurement ; although, like the artists, we can run our rule over one or two points, and then take in the details with the eye.

When making a few remarks on what is understood as good shape in horses of different classes, I will not so much repeat accepted rules as notice a few exceptions to them.

The head of every horse is an important point to be observed and studied. Mechanically considered, the head, by its form and position in relation to the neck and trunk, regulates the action and powers of the horse. Functionally, as the seat of the senses, the head indicates the general character of the horse ; and this is the more important consideration.

Good heads, I consider, may be found in two forms ; firstly, we have the Arab type of head, with its broad forehead, tapering muzzle, capacious nasal cavities, small ears, and large free space for the breathing apparatus to play between the upper vertebræ of the neck, and the broad expanse of the lower jaw. Everybody agrees in considering such a head as most beautiful when it is in keeping with the rest of the horse. This character of head, transmitted down a line of our blood-horses, pervades the breed, and is exhibited to a great extent in our mixed breeds. Nothing tends to stamp the character of cross-bred horses so much as this head, taken in con-

nection with form. It is by no means my object to disparage this caste of head, which is characteristic of the finest Asiatic horses, but simply to remark, that the head which becomes one horse or class is not the best for all.

The Barbs generally present a different type : in these we find the horse larger, his hind quarters somewhat drooping (not like the vulgarly-bred horse, but resembling many stout racers), the chest deep, with large fore-quarters and loin ; the profile is longer and more flattened, the ear and eye very beautiful, all giving a placid appearance, whilst the head is fully as easily placed in relation to the neck and trunk as that of the Arab just noticed ; moreover, the nasal passages are fully as capacious in this class of oriental horse as in the other.

The Barbs formed in all probability the parent stock of fine horses extending over the south of Europe, as their characteristic qualities have always been exhibited in the Andalusian horse, the Calabrian, the choice old breeds of Rome, and those of the island of Sardinia ; and their form of head is characteristic of some of the English lines of blood-stock to the present day. When the broad square head is found in common breeds or in the heavier class of horse, it looks dull, as is seen in those of Central Europe, including those of Switzerland and France.

Artists have fallen into the way of always giving the same head to all forms of horse ; and the Paris prints always show the uplifted head, with expanded nostril, and out-stretched tail. But our colossal figures of great horses with these square heads are quite out of keeping. That I may not be supposed to admire the large bony head of the horse of Flanders or Normandy, or some of the English horses, I will point to Voltigeur as the representative of the fine type I approve of.

The point to be looked to in the head of a horse is its connection with the neck, so as to admit of its being brought into a graceful position, when the horse is easily broken, moves gracefully, and breathes freely. If a cross-bred horse combines a large square head with a defective connection in relation to neck and trunk, he cannot bring his forehead into a good posture ; and if this be attempted he breathes with difficulty ; hence many roarers are found of this form.

Let us, then, improve heads by careful breeding ; but not try to obtain on one horse the head which would have better become another.

Whether looking at stallions, mares, or their produce, breeders will be more likely to arrive at a correct appreciation of their worth if they take the whole animal in view at a glance, when, if nothing offend the critical eye, it is most likely that more strict and patient examination into details will confirm the first impression. Men, on the other hand, who are always talking of points, and criticising in detail without knowing what relation one part bears to another in



producing such effects as constitute good action, are seldom right by chance.

The choice of a stallion with the idea that something in his shape may correct a defect in the mare is seldom found good in practice ; that a horse has good hocks, whilst all the rest is indifferent, cannot justify his selection : I have never seen good derived from these compromises ; sire and dam should be good all over.

Two measurements may be taken of a horse, which will be found useful and afford instruction, after which the rest may be left to the eye and the touch. Every symmetrically formed horse in good and normal condition will be found to measure about one-fifth more in girth, viz., round the circumference of the chest, than he measures in height ; he should be of the same height, when standing on level ground, over the withers and rump.

By this rule a perfectly-formed stallion of 16 hands in height will girth 80 inches, whilst the good Clydesdale of 16 hands 3 inches will fully sustain that proportion ; and horses of lower standard show no noticeable difference where we find perfection in form.

When the above proportion subsists, the form of the horse will generally be good. Such form insures a good loin, and, almost as certainly, the well-placing of the shoulder and the good proportion of the limbs, the form and character of which must be scrutinized to the ground : light, powerful, and easy movements result from proportionate construction.

The paces of the horse, the walk, trot, and gallop are all brought into use in the hunter and hack, as they are also constantly exercised in turn by the animal when free. Of the two subordinate and more artificial paces, the amble is seldom seen in England, nor does the English horse take to it easily ; but the canter is a common requisite, and is a distinct movement, though it has been regarded as a slow gallop, to which, however, it has no real resemblance : the so-called canter in the trainer's language, is a gallop, and no canter at all.

Passing over the important paces of walking and trotting, I have a few words to say on the faster, the gallop.

Under the conviction that those who have attempted to describe the gallop in the horse proceeded by chance, with insufficient knowledge of the laws of progression, I have devoted much time to experimenting on different animals.

The accompanying diagram, taken from my unpublished collection, shows two representations of the gallop. Figure 1 represents the impressions left by the feet of a five-year-old well-bred Irish mare, which measures 15 hands 2 inches high, and is in other respects of good form and action. The mare was galloped over the fresh sands on the sea-beach for the experiment on 30th November 1861, and this figure shows the prints on the sand and the relative position of the feet when in action.

No. 2 shows a similar measurement, in the instance of a two-year-

old racing-colt in training ; it was taken on the 13th January 1862, on Richmond Moor, when the colt was going at a good gallop.<sup>1</sup>

Before I make remarks on the gallop I must say a few words on the descriptions hitherto published.

By all the writers with whom I am acquainted the gallop is described as consisting of a succession of leaps ; the horse's feet and limbs are placed in all sorts of positions but the right ; whilst the great artists who have understood the subject best, from some motive or other, have generally represented the horse whilst standing still. The subject of proportion and progression has been looked on as settled by Vial de St Bell, in his Essay on the Proportions of Eclipse, published 1795, who exhibited a diagram which is as erroneous as the text which gives the measurements. Passing over other teachers and writers, we come to the late Mr Percival,<sup>2</sup> who gives the views which up to the time he wrote had been published by others. He says (page 150), Mr Blaine observes, that "as the two fore feet at once beat the ground together, and then the two hinder, so it is evident that the gallop of speed is nothing more than *a repetition of leaps.*"

Mons. F. Lecoq is also referred to by Percival, as calling the gallop "a succession" of leaps. Mons. Lecoq, in the later edition of his elaborate work on "Progression," p. 432,<sup>3</sup> adheres to his previous description.

Neither have these so long prevalent notions been limited to writers on the horse. Naturalists and comparative anatomists have taken for granted, that what was so authoritatively given with illustrations, amplified by elaborately-written pages, was all reliable and sound. The action of the horse has puzzled some of the greatest among human physiologists, the movement of the quadruped being found more complex, when attempts were made to analyse them, than those of man : these difficulties, however, seem all to be based upon a misconception of animal locomotion generally.

Dr Humphry, in his large work on the human skeleton, published in 1858, follows in the beaten track on the subject of progression ; and the professor, in his more recent work, published in 1861,<sup>4</sup> goes still more at length into the supposed action of the horse, to illustrate that of man, where it is very clear that he is

<sup>1</sup> To Mr John Coates, trainer to the Earl of Zetland, I am indebted for some useful assistance in procuring some measurements of stride of the race-horse ; one of which is of the two-years-old colt, whose stride was taken for the annexed diagram.

<sup>2</sup> Twelve Lectures on the Form and Action of the Horse. By William Percival, M.R.C.S., Veterinary Surgeon to the 1st Life Guards. Longman and Co., London, 1850.

<sup>3</sup> Traité de l'Extérieur du Cheval, et des principaux Animaux Domestiques. Par F. Lecoq, Directeur de l'École Impériale Vétérinaire de Lyon, &c. 3<sup>me</sup> édition. Labè, éditeur, Place de l'École de Médecin, Paris, 1856.

<sup>4</sup> The Human Foot and the Human Hand. By G. M. Humphry, M.D., F.R.S., Lecturer on Anatomy and Physiology in the University of Cambridge, pp. 66-67.



# LENGTH OF STRIDES.

## I. GALLOP OF IRISH MARE.



## II. GALLOP OF RACEHORSE IN TRAINING.



misled by the teaching on the physiology of the horse, and consequently the author's special subject has not profited by the importation.

My two diagrams represent two animals as galloping, with what is called "right leg first;" these figures cannot, however, show movements in the order of sequence: I will therefore explain; and then show how the force is distributed over the four limbs, and how they move in succession.

The horse getting under weigh, which is done with least expense of power in a walk or trot for a few paces, pitches into his gallop more or less rapidly; in doing so the near hind foot is first moved, next the near fore, the off hind and off fore following in sequence, so that the off fore, which in the case is said to be going first, is the last to be raised; if the horse changes his leg the order will be reversed.

It is only in the canter and gallop that the hind foot does move first. The line of gravity as Borelli states, is kept perfect by the first move in the hind foot: that limb being the first to make a short preparatory move, it next makes the fifth move, following in sequence to the off fore leg, and this is the true order of movement afterwards kept up.

The horse's balance in his gallop is as perfect as when he is standing or walking; he is so distributing his power, and the feet moving on the ground are one by one raised, and in the same way and succession implanted. Two feet of the horse are always on the ground in varied positions; whilst of the other two, one is disengaged in the air and the other in the act of alighting or rising. But the horse, the observer will say, gallops by strokes seemingly, using a renewal of efforts, his power is exerted in diagonal lines, thus the action of the near fore and off hind leg moves in close sequence, off fore and near hind following. The sequence of action between each fore foot and its diagonal hind on the ground is so blended, as to make the exertion of one continuous leverage. However we may regard his action, the horse's equilibrium is perfect; the two lateral limbs move in sequence, so that the fore is always carried forward before the hind has passed the centre of gravity. I have hitherto observed the movements, in diagonal and parallel lines; the fore limbs, in each direction, preceding the hind, with the exception of the first move in the gallop and canter, required as a preparatory and balancing move, not amounting to a full stride.

I cannot admit that either the horse in galloping, or any other quadruped, flies through the air by means of a succession of bounds: all jumpers are slow movers, and the horse loses time by every jump he takes; the faculty of leaping is reserved for a particular purpose, and not employed as a means of fast progression—a little serpent will go twice across a broad road on its belly before a frog will get once over it by jumps.

If by any device a steam-ship could be so constructed that its paddles were made to strike the ocean-waves as the horse's feet are



implanted on the ground, with what speed, steadiness, and safety would it advance ! If we watch a race where the upper part of the horses and riders are alone in sight, because some obstacle such as a hedge or wall hides the movement of the horse's legs, we shall see directly that the horse does not jump or oscillate, but moves evenly, as a bird flies, or rather as the masts of a steam-ship, when the jerking movement of the machinery is in like manner out of sight. Moreover, the distance at which each foot is implanted from where it was taken up, is no way dependent on mere length of limb, but represents the product of all the motive powers exerted ; the velocity at which the body is moving through the air determines the distance of stride.

If the physiology of progression in the horse can be made plain, such knowledge will, by leading to a better appreciation of symmetry, be of the first importance in practice. It will be recognised from the tenor of this essay that height and long legs do not necessarily give long stride ; and we may come to understand how it was that Daniel O'Rourke and Little Wonder, when under 15 hands high, beat for the Derby in their respective years good competitors which were a hand higher than themselves. We shall further see how it is that a little animal like the fox is able to run for two hours before animals similarly constituted and much larger. The same law is in operation in one case as in the other.

I will conclude with a few remarks about the feet of young horses of different ages before being put to work. If two pieces of advice which I have given be carried out, the feet will not require much art ; if the stock can have plenty of space the friction caused by exercise will keep the hoof in proper form, and the inner structure will by the same influence be duly developed. Besides this, if horses when brought under cover, stand on a dry, hard bottom, the feet will acquire form and strength. Periodical visitations, if to wash and clean the feet, should by all means be adopted ; though, if the frogs are free from thrushes, there is no necessity for operating on the feet. Paring the feet I do not think advisable. Once or twice in the winter, if the colts cannot get room out of doors, a blunt old rasp may be taken to equalize the plantar surface of the feet, and a little lowering of the outside may be necessary, especially with narrow-chested colts. The greater wearing down of the inside is apt to twist the foot and pastern, and even tends to turn the elbow in. Whenever mares or foals are deranged in health, a veterinary surgeon should be called in early, as nothing prescribed by anticipation is likely to meet the requirement.

New Veterinary College, Edinburgh.

# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### THE PAST MONTH.

RARELY can we review the events, of interest to the Veterinary profession, of a single month with greater pleasure and satisfaction than we can those of the month of October 1863. The Social Science Congress in Edinburgh was the immediate cause of a profitable discussion on cattle disease, led on by a judicious paper from Mr Holland, the member who introduced a bill last session to provide better means for the prevention of contagious diseases amongst animals. Mr Holland's paper is gratifying to us, because the plain statement of the causes which led that gentleman to consider the question of cattle disease with a view to legislation, is a sufficient refutation of the absurd remarks in an agricultural journal concerning the origin of the movement. The discussion which followed the reading of the two papers published in this number of our Journal was of the most satisfactory description. With the tact peculiar to the "North British Agriculturist," no speech was inserted into their columns at any length but the one by Dr Alexander Wood. We refer our readers to the discussion, which we print, corrected as it has been by each speaker, not excepting Dr Wood. Fair play is a jewel of no ordinary worth, and we have long since ceased to expect anything like impartial treatment in the columns of the "Agriculturist." Happily, however, we are riding the winning horse. Many years' labour have been devoted to the task; but it is with feelings of no ordinary gratification that we look back, not only to the Social Science meetings, but to the manner in which the journals of every kind, and of every shade of opinion, have approved of the efforts made, and to the great success attending a public meeting in London, in which our most vigorous supporters were the London dairymen.

The Veterinary Profession will be pleased to see that Mr Holland approves of some restriction being placed on the assumption of the title of Veterinary Surgeon by persons who have no right to use it.



Such a measure is urgently needed, and Mr Ernes, the President of the Royal College of Veterinary Surgeons, has prepared a draft of a bill which must, we think, be regarded by all as quite unobjectionable. We hope there will be for once unanimity amongst the Members of the Veterinary Profession, and that a step calculated in an eminent degree to further their interests may not be retarded by those who have more than once shown themselves to be inimical to professional union and strength. Every Veterinary practitioner, qualified or unqualified, ought to work and use his influence to further the passing of the Bill prepared by Mr Ernes. We think we should have one or two meetings of the Profession generally, and would suggest that York would form a central city, most favourable for a professional gathering, not later than December. We shall be most happy to take some share in directing the movement, if our friends wish to have an opportunity of openly discussing this subject, without having to travel so far south as London, or so far north as Edinburgh.

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## ROYAL COLLEGE OF VETERINARY SURGEONS.

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### QUARTERLY MEETING OF COUNCIL.

The Quarterly Meeting of the Council was held the 14th day of October 1863.

**PRESENT :—**The President, Professors Spooner, Varnell, and Gamgee, Messrs Aitken, Braby, Broad, Dickens, Ellis, Field, Harpley, Harrison, Jex, Lawson, Mavor, Moon, Pritchard, Robinson, Wilkinson, Withers, and the Secretary—The President in the Chair.

The minutes of the preceding meeting were read and confirmed.

After the correspondence, a letter received from Mrs Gabriel was read, in which she stated, "That, owing to the protracted illness of the late Secretary, Mr Gabriel, she was induced to solicit the continuation of the allowance so generously granted to him by the Council of the Royal College of Veterinary Surgeons; her husband being so confirmed an invalid rendering its renewal of deep importance."

It was moved by Mr Field, and seconded by Professor Spooner :—

"That the allowance of L.50 to the late Secretary, Mr E. N. Gabriel, be granted for the ensuing year."—Carried.

The Registrar reported that four deaths had occurred during the quarter; viz., Mr John Brown, Leeds; Mr Charles J. Milner, Minster in Sheppey; Mr Matthew Poett, Army Staff Corps; and

Mr John S. Stockley, Royal Artillery. Also, that 190 copies of the "Register" have been sold, and 140 copies gratuitously sent out to masters of hounds, news rooms, and literary institutions.

The Secretary announced that he had received the three beautiful anatomical specimens now on the table, presented by W. J. Goodwin, Esq., for the Museum.

It was moved by Mr Wilkinson, and seconded by Professor Gamgee—"That a letter of special thanks be written to W. J. Goodwin, conveying the appreciation of the Council of his valuable gifts."—Carried.

A prize essay on "The Breeding of Hunters and Roadsters," by Joseph Gamgee, sen., was also presented to the library by the author.

It was moved by Mr Braby, and seconded by Mr Field—"That a vote of thanks be given for the same."—Carried.

The House Committee, in their Report, recommend a floor cloth for the Museum, and a cowl for the chimney—a carpet for the library—and half a dozen chairs for the student's room.

It was moved by Mr Wilkinson, and seconded by Mr Jex—"That the Report be received and adopted."

The Finance Committee report that the quarterly accounts have been examined and found correct. The liabilities amount to L.82, 11s., 4d., which they recommend to be paid, leaving the balance in hand L.553, 15s. 1d.

It was moved by Mr Pritchard, and seconded by Mr Dickens—"That the Report be received."

It was then moved by Mr Robinson, and seconded by Mr Jex—"That it be adopted."

The Parliamentary Committee laid before the meeting a draft of a Bill for an Act of Parliament, to be entitled "The Veterinary Medical Act." The draft contained eight clauses, which was read by the Secretary; after which each clause was then taken *seriatim*, and after a very considerable discussion some abridgments were made, and certain alterations in the clauses were deemed necessary. The draft of the Bill was then agreed to.

It was ordered that the Secretary should submit the same to Mr Garrard, the legal adviser of the Council, for his opinion; and also in order to ascertain the cost and the expediency of bringing in the Bill in the first instance before the House of Lords, together with every necessary information as to the notice to be given, &c., and that printed copies of the same be printed and distributed to the Members of Council for their consideration before the next meeting.

Cheques were ordered to be drawn for the current expenses.

By order of the Council,

WM. HENRY COATES, *Secretary*.



## DISCUSSION.

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*Discussion at the Meeting of the Association for the Promotion of Social Science on Mr HOLLAND'S and Professor GAMGEE'S papers "DISEASES IN CATTLE."*

MR ROBERT RAWLINSON, Civil Engineer and Sanitary Commissioner, complimented Professor Gamgee on his paper, stating, that, in his (Mr Rawlinson's) opinion, the subject of the sale of diseased cattle was of the utmost importance to the nation. Mr Gamgee had made the question peculiarly his own; and, by his rare scientific knowledge, and untiring investigation, might be said to have exhausted this subject. It only remained now for this Association to second, in the most energetic manner, the recommendations made by Professor Gamgee to Government, and for Parliament to prepare and pass such laws as shall give full effect to preventive measures. As Sanitary Commissioner, it had been his (Mr Rawlinson's) duty to examine and inquire into the state of slaughter-houses in many of the towns in England, and in the course of his duties he had seen abominations which he could not trust himself to describe in that assembly. Some of the large towns in England had inspectors, but this inspection—most imperfect as regarded the town—was limited by the municipal boundaries of the several districts. Some years ago, it had been his duty to inspect a township (Newton-Heath) bordering on Manchester, and found twenty separate places used as slaughter-houses by men known locally as "*Slink Butchers*." Into these places sound meat never entered, but cattle in the last stages of disease, and "dropped calves," called "*Staggering Bobs*." These vile slaughter-houses were just beyond the boundary of Manchester, in a district known as "*Gagg's Fields*," and although the inspectors and police could see them and the carrion they contained, they could not stop the trade; but month after month, and year after year, tons upon tons of diseased meat were openly sold. On asking where such stuff went to, the answer was, Into Manchester; principally to make cheap soup and cheap pies. And yet there were diseased meat-inspectors in Manchester.

With regard to slaughter-houses in general, under so-called inspection, nothing could be worse than some of these places as I have seen them. In the public places pigs were fed on blood, on garbage, and on carrion; and the private slaughter-houses were crowded in amongst dwelling-houses, creating nuisances which make life a misery to the unfortunate inhabitants adjoining these places. Many of these slaughter-houses open on to public streets, so that passers by, young and old, and even children, can witness the revolting process of slaughtering, skinning, and cutting up of animals.

With respect to the supply of diseased meat to our army

and navy, the contract system ought to be abolished. Professor Gamgee had shown that contracts are taken at so low a figure, that diseased meat, to an enormous extent, is salted down, and when once so salted, it cannot well be detected, and is passed into store. Government ought not to contract for meat, if it could not escape a supply of diseased cattle. Parliament and the taxpayers would not grumble to pay the price necessary to supply to our army and our navy sound, nutritious, and wholesome food. To give a low price for diseased meat is to waste the money of the nation, and to tamper with the health of men told off to defend the liberties of the nation.

Inspection of cattle and of meat is of national importance, and ought as soon as possible to be taken up by Parliament. Isolated inspection is of little use—one town here and one town there. The City of London, under the able superintendence of Dr Letheby, with the rest of the vast metropolis left out, is a mockery, a delusion, and a snare. There is the name of inspection without the reality. The evil might be repressed in one place, but only to rage with tenfold force in the neglected districts. Centralization is no doubt an evil as practised in some countries on the Continent; but the very word "*Government*" implied that there is something to govern and to be governed. And it must be the imperative duty of any Government, worthy of the name, to do that for the people which is necessary to health, and which communities and individuals cannot do for themselves. This Section ought to move the Association, and he, Mr Rawlinson, hoped that the Association would not cease its labours until the recommendations of Professor Gamgee were adopted by Government, and were passed into law.

Dr M'KINLAY, Paisley, said he could entirely corroborate, from his own experience, the statements made by the gentlemen who read the papers. He had had frequently to condemn diseased meat, and he invariably found it to be more or less poisonous. He especially referred to one case, where death ensued through a child eating unwholesome meat.

Mr EDWIN CHADWICK, C.B., complimented the writers of the two papers for the great public service they had rendered in bringing that subject forward. He thought that, whatever the Social Science Association could do, they should do to support the legislative efforts of Mr Holland on that subject. Any effort out of doors would be of little use unless some member in doors took up the subject as a *specialité*; and he thought that Mr Holland had rendered very great service to the agricultural public, as well as the community at large, by doing that.

After some remarks from Mr HOWARTH on the prevention of disease amongst cattle by cleanliness, ventilation, and the use of charcoal as a disinfectant—



Dr ALEXANDER WOOD said, that while no one could for a moment hesitate to regard the consumption of diseased meat by human beings with extreme disgust, yet he would like to know whether the gentlemen who had read the papers could prove that any connection existed between any specific disease and the consumption of pleuro-pneumonia meat. He had failed to gather that such a connection existed from the statements of Mr Holland and Professor Gamgee. There were abundant statements that, in the opinion of Dr A. and Mr B., the use of diseased matter did produce disease, but he (Dr Wood) desiderated the facts on which these opinions were founded. He would give his hearty concurrence to the movement originated with so much talent and energy by Professor Gamgee ; but before they launched out into statements that diseases resulted from the eating of diseased meat, they should be prepared to say what these diseases were, because it was a new fact that meat so diseased would, after it was cooked, produced any specific disease. He had yet to learn as a medical man and a pathologist, that there was any direct connection between any specific human disease and the consumption of diseased meat. It had been stated that pleuro-pneumonia was not known until the huge and recent importation of cattle from the Continent. If this were the case, and if the consumption of this diseased meat prevailed to the extent stated, there ought surely to be evidence that since this importation and this consumption some new diseases had appeared, or some recognised diseases had appreciably increased ; but he had yet to learn that this was the case. Before they entered into an agitation on this question, he thought they should clearly understand what were the evils complained of, and how they were to be remedied. Dr Wood referred to cases in the Fever Hospitals where dogs and other animals had been fed upon diseased matter which had been removed by operation from the human subject, and in no way whatever could the production of disease be traced to this kind of feeding. It would be necessary to show not only that pleuro-pneumonia meat did produce disease, but also at what particular stage of the disease the danger commenced. He had been informed by a highly respectable gentleman farmer, a member of the Association, that if an animal attacked with pleuro-pneumonia were slaughtered soon after its seizure, its carcase looked as well and would command as high a price in the market as the most healthy meat. Of course if the supply of meat be very much diminished the price must rise, and it became a question whether the poor were put in a worse position by being deprived of butcher meat altogether, or occasionally to use that which, although diseased, had been slaughtered at an early stage. No doubt it was an exceedingly disgusting thing to eat diseased meat, but that was a very different matter from showing that this fact produced disease in the human frame.

Mr CHADWICK said that, while he could not give any instance of a specific disease produced by eating diseased meat, he had been assured by the officers of workhouses and similar institutions, that they had found it of the greatest importance to preserve the inmates of such places from the influences of diseased meat, as they always led to ill-health.

Dr MARKHAM had great pleasure in acknowledging the services rendered to science by Professor Gamgee in calling attention to this subject; and said that he wished to render those services still more distinct by asking Professor Gamgee not to draw any but well-supported conclusions from his premises. He must say, that he had never yet seen any satisfactory proof of the statement so often made, that diseased meat used as food produces disease in man,—meaning by diseased meat the flesh of animals which had died of, or been killed whilst suffering from, pleuro-pneumonia or any other acute febrile disease. Of course every one admitted that meat containing parasites could, when eaten, produce parasitic disease in man; but these diseases came under quite another category. At the same time it should be added, there is no reason to suppose that the flesh of the animal is injured otherwise than mechanically by the presence of the parasite; and that there is reason also to believe that the parasites are destroyed by cooking. Mr Gamgee had referred to the excellent inspection abroad, and it was a well-known fact, that the cases of malignant pustule, concerning which so much had been said, were common abroad and rare here. Moreover, if, as Mr Gamgee said, such a large amount of stock is being destroyed by disease, he (Dr Markham) could not understand how the supply of animal food can be curtailed from this cause, if all diseased animals are slaughtered as human food. He agreed with Dr Wood that, in regard to pleuro-pneumonia and other diseases, they might fairly believe that if the animals were killed in an early stage of the disease, there were no *a priori* arguments why the eating of the flesh should produce disease.

Mr JAMES HAUGHTON, Dublin, thought there was only one class of the community who could give an unbiassed opinion on this subject. He referred to the vegetarians, to which class he had belonged for a good many years. Before, he scarcely knew what good health was, but since he had become a vegetarian, he hardly knew what ill-health was. He considered that all those who ate meat at all did wrong and injured themselves. (Laughter.)

Dr ARCHIBALD SMITH drew attention to the fact, that all over the Highlands, wherever the native tacksman still employs the Highland servant, all the sheep dying during the winter of braxy were used as human food, and considered perfectly wholesome. He knew no class of men more healthy than the Highland shepherds. Braxy abounds most on the richest pas-



tures, attacking the fattest sheep at the fall of the year. Any noxious quality created by disease must, at all events, be counteracted in preparing the braxy hams, as he (Dr Smith) had never learned, during a long residence in the Highlands, and especially in his native county of Argyle, of any baneful effect produced by it.

A gentleman rose and disputed the accuracy of Dr Smith's statements as to the consumption of braxy on the hills; and after him the meeting was addressed by Admiral SAUMAREZ, who said, addressing the President, "Permit me, Sir, to add my testimony in proof of the dangers attending the use of diseased meat by the people. As an old naval officer, I can testify to the fact, that when our vessels were supplied with meat, especially in the West Indies, without due attention being paid to its wholesome condition, a large amount of disease was induced by it. Diseased meat may be less injurious here, but in hot climates it is highly dangerous. I have suffered myself, and have repeatedly seen the worst effects induced by it amongst seamen.

Sir CHARLES HASTINGS said that he thought that the facts hitherto adduced to show that the eating of diseased meat produced any particular class of disease had completely failed. Nevertheless he had himself been repeatedly consulted, as indeed had other physicians, when families had suffered very severely from the effects of eating animal food, which, there was good reason to believe, must have been charged with some deleterious principle. He had no hesitation in saying that, although the effects of diseased meat were not very manifest, any city supplied with such food would indicate a lower standard of health than one in which the animal food supply was perfectly sound. Such being the case, he thought that the Association should give its support to the movement which Mr Holland and Professor Gamgee had inaugurated.

Professor GAMGEE then rose and said:—"In reply to the various gentlemen who have taken part in this discussion, and especially with reference to the remarks by Dr Alexander Wood and Dr Markham, I have to say that I consider it was quite competent on the part of Mr Holland and myself to write on any point connected with the subject of the traffic in diseased animals, and had we enlarged on the topics concerning which Dr Wood required further information, we should have had to deal with facts and revelations far too horrible to be brought before such an audience as that we have the honour of addressing this day. Though in no way anxious to evade the discussion of the injurious effects of diseased meat on the people that eat it, it must not be supposed that I advocate purely on that ground the stopping the traffic in diseased animals. I know that that traffic has injuriously affected the supply of food for the people in so far as quantity is concerned; and instead of the production of animal food increasing in a certain adequate ratio with the increase in the population,

we find that it has positively diminished, and especially during the years of the extraordinary prevalence of contagious disorders. Dr Markham thinks with some, that to condemn all the diseased cattle would be simply to diminish the amount of food available for our people. There may be exceptional instances in countries differently situated to our own, in which to bury all the animals slaughtered diseased would be to create a famine; but I can most positively state that there is no disease at present raging in the United Kingdom which cannot be prevented with the greatest certainty, and the advantages of the system of prevention above that of killing out the diseased cattle have never been properly shown up. I can readily explain how disease amongst animals tends directly to the diminution in the amount of meat for the people. A farmer buys fifty head of cattle, and six weeks after purchase he finds one to have the lung-disease. That animal may be slaughtered early, but the effects of the six weeks' feeding are lost on it. It is very rapidly reduced, and within a very few hours loses ten per cent. of its weight. The first case is soon followed by others, and it commonly happens that animal after animal is sent off to the butcher over a period of time sometimes exceeding a twelvemonth, and during which the food given to the cattle might have been thrown on the manure heap with as much profit. Many of the diseased animals enter our lean stock-markets, and the lung complaint spreads so that thousands of acres of rich land on which the diseased herds are fed may be regarded as absolutely lost to the country.

But, in the next place, I have always insisted on the fact, that the sale of diseased meat should be stopped, as it constantly leads to the public being grossly defrauded. A farmer sells an ox for four or five pounds, on which the butcher makes a profit of five, ten, and fifteen pounds, which he must occasionally obtain from the public by selling unsound as sound meat. I am anxious that the public should have real value for its money, and when it asks for bread it should not be handed a stone.

As to the prejudicial effects of diseased meat on the human constitution, it has been said that the evidence adduced has been found wanting. I am happy in being able to state, that I am quite prepared to demonstrate the truth of every assertion I have made on this subject, and I refer those who wish to know my views on the matter to the many papers I have published, and especially to the admirable Report by the learned Medical Officer to the Privy Council, as also to the Appendix to that Report, which includes a statement of the results of my inquiries into cattle disease, in relation to the supply of meat and milk. Sir Charles Hastings and others think that we have not yet traced to the consumption of diseased meat the development of any distinct class of disorders. And what do they consider the parasitic affections to be? Do they not constitute disease? There are countries in which, owing to the prevalence of parasitic diseases



in animals, a very heavy percentage of the deaths amongst human beings is to be ascribed to parasites; and in our own land there are not hundreds, but thousands of human beings afflicted with tapeworms, and there is a far larger percentage of people than any one might think possible suffering from trichina. A human being may eat some diseased meat and die shortly after, manifesting symptoms which the physicians would ascribe to acute rheumatism; and yet a careful examination would reveal that the disease was not rheumatic, but parasitic, and due to the eating of diseased meat. The case recently reported by Dr M'Kinlay of Paisley illustrates the class I am alluding to—a class of accidents concerning which medical men have unfortunately been in considerable ignorance. But, apart from the parasitic diseases, we have the blood affections, which are becoming more and more prevalent year by year. It has been justly stated, and the fact is undeniable, that throughout the Highlands of Scotland, braxy mutton is extensively used, and with perfect impunity, but the explanation of that has been satisfactorily stated by Admiral Saumarez. Fortunately, we have rarely in this country a sufficiently high temperature for the development of a virulent anthrax poison; but if we visit the Alps, the Appenines, or the Pyrenees, we see the people destroyed by bubos and malignant pustules, which prove fatal in a very few hours. Dr Markham thinks that the prevalence of malignant pustule abroad, to so much greater an extent than in Britain, indicates that the system of inspection that I have extolled elsewhere must be more defective than our own. There could be no greater fallacy than this deduction. Last year, when at Bruxelles, I visited the excellent slaughter-houses of that city, and though it happened to be a day that the place was crammed with many hundred carcasses of all kinds, I only saw one diseased one, and that had the inspector's mark on it, and was condemned. The prevalence of malignant pustule abroad is to be traced to the country-killed meat, and it is prevalent in districts where anthracic diseases amongst animals abound. It must not be supposed, however, that we are quite free from similar diseases here, and much information has been gathered on the subject by a learned English physician, Dr William Budd of Clifton. Singular cases might be collected here from all quarters, if we knew how to get at them. Thus I have been informed of a case which occurred in a village in Lanarkshire. A calf died,—it is said of black spald or anthrax. As the Sunday after the death of the calf was sacrament Sunday, the villagers were supplied with portions of this calf, and all that ate of it suffered very seriously. I am not aware of any case of death resulting, but some persons who partook of the veal required medical assistance daily for a considerable period of time.

I cannot conclude without noticing the remarkable circumstance, that diseases which are calculated to render the flesh of animals very dangerous as human food are greatly on the increase.



One new disease, I was the first to describe in 1858. It is the true milzbrand of the Germans, and is here termed splenic apoplexy. Wherever the flesh or the internal organs of animals dying of this disease have been given raw, or in the cooked condition, to pigs, dogs, and ferrets, the animals thus fed have died. I have heard of many instances in which cattle suffering from this disease have been sent to large towns as human food; and I have no hesitation in saying, that medical practitioners have been called to cases in which the blood extravasations and stupor have been mistaken for the symptoms of typhus, when in reality they were due to an animal poison which had entered the system in meat eaten. Dr Ogle of Derby wishes to know how medical practitioners can assist in the important work of checking the traffic in diseased animals. They can assist by agitating the subject and collecting information. Popular opinion must be formed, so as to urge on Government the adoption of rational measures for the prevention of disease amongst our domestic quadrupeds.

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### PERISCOPE.

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#### ON THE BREEDING OF HORSES—A LETTER ADDRESSED TO THE RIGHT HONOURABLE JOHN EVELYN DENNISON.

By W. DICKENSON.

*(From the Journal of the Royal Agricultural Society.)*

MY DEAR SIR,—You have asked me to give you an outline of my experience in breeding horses, with special reference to my success with the cart stallion I imported from France, to the intent that it may be published in the Royal Agricultural Society's Journal. If you think anything I can state will be interesting to the members of the Society, I shall have great pleasure in complying with your request. I have been engaged with every class of horse, from the winner of the St Leger to the horse walking in the cart, and purpose to make mention of them all, except the racehorse, which I shall merely notice so far as he exerts a general influence for good or for bad upon our horses at large.

And first permit me to address some general remarks to those members of the Royal Agricultural Society who have had less experience than myself, and beg the indulgence of readers who may think that I enter too much into the detail of a subject with which they are well acquainted.

It is necessary to consider, before beginning to breed horses, whether the land designed for it is fit for the purpose of breeding sound, healthy animals. If it is, the starting-point is right—you have reason to hope for success; if it is not, it is far wiser not to make the attempt, but to buy in and sell out as quickly as is convenient. It is thoroughly well known that sheep bred upon wet, undrained, boggy soils, have defective constitutions; they have diseased livers, decayed feet, and inferior wool, and are so thoroughly unsound in many instances that they die in great numbers without remedy. Horse-breeding may be attended with similar risks, which should be steadily kept in view.

Horses should be bred upon a dry subsoil to make them sound in constitution, sound in wind, and sound in colour, by which I mean that whatever be the horse's colour, it should be a deep, not a faint one. The surface, moreover, should be fertile, abounding in carbonate and phosphate of lime, to grow horses of full size, with plenty of bone and muscle. Upon this subsoil and this surface, you may expect sound, full-sized, healthy animals. A wet, spongy, clay soil produces delicate constitutions, defective wind, pale colours, and large flat feet. If your



land is not dry naturally, perhaps it can be made so by effective drainage ; if it cannot, do not attempt to breed horses—every kind of disappointment will follow such a course. Neither are a very dry subsoil and very dry surface desirable, for these produce small animals with narrow, contracted feet.

The next step is to procure good mares to breed from ; these should not be used because you have them, still less because they are unsaleable, but should be bought for this especial purpose, and selected with great care. I should advise their being bought in the autumn of the year, when two years old off, to be put to the horse in the following spring. I advise this because they are all brought to market at that time, the choice is greater, they are purchased at less cost, they are more free from defects, and also breed much better. They have never been made up, but are brought direct from the grass fields, which is very important as to soundness of wind and limb. No one has ever tried to breed from them, and sold them because they fail to do so ; if they are unsuccessful in your hands, you can part with them at five or six years old, most likely at a profit.

It is important to have made up your mind fully what kind of horses you propose to breed before you begin to select the mares. They must be the very best of their kind, with the best action, and free from all defects of wind and limb. Such animals as are roarers, or who have curbs or curby hocks, spavins or splents, are unfit for the purpose. The toes should point in straight lines ; they should not turn outwards, and had better not turn in. The feet should be of moderate size, not round, but of an oval shape. Convex soles are particularly to be avoided. The excess of substance should be on the side of the mare, she should be made useful on the farm ; the blood on the side of the horse. Where elegance of appearance and speed are to be combined, or either to be had, it must come from the thoroughbred side. Weight and substance come from the cart, but elegance and pace from the blood. There is no substitute for blood where pace and continuance are required.

As I have begun saying something about the stallion, I will just observe with what care breeders of cattle select their bulls, not only looking well at every line of their bodies, but at every feature of their faces ; their width, their length, their colour, and their touch must be approved, and even their ancestors for many generations are taken into consideration. Rams are just as closely inspected. In both cases the action must be good ; they must stand straight upon their legs, and be able to move with ease to themselves. Breeders of horses would do well to use as much care in selecting stallions for their mares ; but I am disposed to think they do not. It is not unusual to avoid the trouble, and put the mares to some convenient horse. Economy sometimes suggests that “this horse is only one or two pounds, he is as good as the absent one, whose price is also double.” Another very important feature is to be observed. Breeders of cattle and sheep keep their best females to breed from—the better they are the longer they are kept ; with horses, the better they are the sooner they are sold, not even the very best young mares being reserved for the stud. Those that cannot find a customer are too frequently kept and bred from ; it is not an unusual saying with disappointed breeders, “If I cannot sell her I will put her to the horse.”

Great advances have been made in the breeding of cattle, sheep, and pigs, in every part of the United Kingdom during the last forty years. What is the case with regard to horses ? Have they not retrograded in the same degree ? Can the present race of horses be compared with those bred forty years since ? The cart-horse, perhaps, is the only class that can bear the comparison. There is a cause for all this, which I shall mention hereafter.

Here I close the general remarks, and proceed to mention the cart-horse I imported from France, with the result of my practice. I fancy some of my readers saying, What induced you to buy a French horse ? Could you not find one good enough in your own country ? My answer to those persons is, Yes, I could, and did so. I bought what I thought, and others thought too, a splendid horse ; I bred from him, and so did my neighbours, very good horses ; and I should have continued thinking there were no better cart-horses in the world than the English ; but in 1855 I went to the International Exhibition in Paris, where I



had sent some short-horned cattle. There my attention was attracted to a class of horse I had never seen before. I looked at them and was astonished, seeing them drawing great long carts, as long as the English waggons, loaded with immense blocks of stone (not as ours are loaded in London, with two or three blocks), walking nimbly away the whole day from the pit to the building. These immense loads of stone made me think of the three or four dray-horses drawing at a much slower pace a few butts of beer through the London streets. These horses, walking so nimbly with these great loads of stone, were not so fat as our own favourites, but they seemed to me to be doing twice the work. Although leaner, they bore the strictest scrutiny; the more I saw of them, the more I admired them. Meeting Mr Jonas Webb, I called his attention to them. He said he had never seen such before; he had observed a horse taking into the show-yard an immense load of provender for the cattle, that astonished him beyond measure; he had resolved to try to buy him, but he lost sight of him that day, and never saw him afterwards. I thought them so superior to ours, that I resolved to buy one to take home. Very much to my disappointment, I could not find one young enough and good enough to buy. I saw them every day at their work, but none for sale. I went through all the dealers' stables without succeeding. I furnished myself with all the information to be obtained as to fairs on my way home; to some of which I went, and found, just as at our common small horse fairs, not a good horse in them. I happened to stop a day at Rouen, when the pavement of the bridge was up, over which great loads of goods had to be drawn to the quay; there again I saw these horses, coming with their great loads of goods, which they could not draw through the mud more than a few yards at once, drag themselves almost to the ground, and I never saw one refuse to draw again and again.

This confirmed my resolution to have one of them; so I made an arrangement with a principal dealer in Paris, and in 1856 bought the horse I call "Napoleon," which Mr Denison has asked about. I have never once regretted the purchase. He has been worked on my farm ever since, almost always with mares. I have never had so good, quiet, active, and powerful a horse before. In no one instance has he given us any trouble. He is unlike our English cart-horses, for with great size ( $16\frac{1}{2}$  hands high, and immense substance, he shows a dash of blood. He has an Arabian head, not small, but of fine character, well proportioned to his size. The neck is very muscular and well turned, the shoulders large, very deep, without lumps on the sides, and oblique, such in shape as would not be objected to for a riding horse. The bosom open, the fore legs magnificent and very short, with great bone, hard sinews, and with little hair upon them. His feet are perfect in shape, and perfectly sound in work; his back short, rather dipped, round-shaped ribs, large loins, rather plain, drooping hind-quarters, very large thighs, low down, and tightly joined together with prodigiously powerful clean hocks, and very short hind legs, well under him. We never have had a difficulty with the engine or thrasher, or with anything in the mud that Nap. could not extricate us from. His stock are as good and kind as possible. It is a saying with the men, that Nap.'s colts want no breaking. My mares are small and active; the stock are considerably larger than the dams, but so cleanly, that as foals they look more like carriage horses.

I think the cart mares, to work and breed, should be of moderate size, from  $15\frac{1}{2}$  to 16 hands. They should be long, low, wide, and handsome, compactly made, with short backs, arching downwards, and with wide table-shaped loin. The legs should be short and clean, the bone large, especially behind. They should be good walkers, and as I recommend working the mares on the farm, the high stepping action must not be overlooked. The mares should not be put to the horse to produce foals before the grass comes in May, when the work of the farm is very much abated, the mares can be spared for a short time, the grass will be convenient for the milk, and the weather warm for the foals. These will do well with the mares at grass (after being kept in for a few nights) till the autumn. I work my mares moderately, up to the day of foaling, and I think it assists the operation; but they should not be put to snatching, distressing work. When



the foals are weaned in the autumn, they must have shelter, and be well kept. A few oats, cut roots, cut hay, and a little bran, will do well for them till they go to grass again in the following summer, during which time the colts must be castrated. In the winter they may again be kept in the sheds. They should never be allowed to get poor. They will be useful at three years old, and do half the work of horses, if kept in a cool, well-ventilated stable.

I have just read some observations made by Mr Ruck, in the course of his recent lecture upon steam cultivation, delivered before the Royal Agricultural Society. He describes the inconvenience he has suffered from the illness of his farm horses, which appears to me excessive when I compare it with my own experience. I will therefore detail with some minuteness how I think such misfortunes may be avoided by gentlemen equally unfortunate with Mr Ruck, who are compelled to employ horses in consequence of their farms being too small to allow of the use of Mr Fowler's steam-tackle.

With the aid of three illustrations I will describe the stable in which the cart-horse can live healthily, consume his food without waste, while the liquid manure is economised for the highest fertilising purposes.

The stable should not be less than 18 feet wide, and of such a length as will allow a 6-feet standing for each horse. It should be 10 feet high. The horses stand in a single row, and the harness is hung on pegs in the wall behind them. This width admits of thorough ventilation to the stable, without subjecting the horses to draughts. Each standing should be parted off by an upright post reaching from the ground to the ceiling rafter, placed 3 feet off from the wall at the horse's head. These partitions should be closely boarded up 3 feet above the manger and hay-crib, to prevent the horses quarrelling about the food, and kicking each other. To each of these posts a bale, 8 feet long and 1 foot 8 inches wide, should be hung by a strong chain, to divide the standings, and suspended by another strong chain at the hinder end from the ceiling rafter. Each chain should have a hook and eye within reach, that may be readily unfastened. This arrangement will leave a space of 6 feet opposite the head of each horse, available for feeding purposes. The manger for corn and chaff may be made 2 feet 6 inches long. It should be 2 feet wide at the top ; 1 foot 2 inches at the bottom. The hay and straw, which should be cut into 6-inch lengths, will require a larger receptacle, which should be 3 feet 6 inches long, 2 feet wide at its upper part, and half that width below. It should be so constructed, that while, even with the manger above, it should reach to the ground, 2 feet above which should be fixed to the wall a bottom, sloping to 1 foot above the ground in the front, where some upright openings should be cut, so as to admit of the escape of the seeds and dirt.

At the top of this hay and straw-crib, an iron rack with bars 6 inches apart should be so hung as to open up and fall back against the wall to let the fodder be put in, and then be put down upon it for the horse to eat through. It should be so much smaller than the opening that it can fall down with the fodder as it is consumed, by which means not a particle is wasted. The manger may be constructed of yellow deal  $1\frac{1}{2}$  inches thick for the front, back, and ends ; the bottom of slate three-quarters of an inch thick. The top of the front and ends should be covered with half-round iron,  $2\frac{1}{2}$  inches wide, screwed on to project over the front outside a quarter of an inch, and three-quarters of an inch inside the manger. This prevents the food being tossed out, and the manger being gnawed. A short post must be put up, as near the centre of the standing as possible, to support the manger, into which a large screw ring must be put to let the chain or rope of the headstall pass freely up and down without constant friction. The manger may be 3 feet 6 inches from the ground to the top ; the hay-crib of course the same height.

The paving of the standings, 3 feet 6 inches from the head, should be flat, then with a fall from both sides to the centre, where an angle-iron drain of 4 inches wide from out to out, with a removable flat iron cover fitted to the inside of it, should be placed straight down the standing, with a fall into another larger cross main drain 10 feet 6 inches from the head, so placed as to carry away the urine from all the smaller drains into a tank outside the stable. This main drain so placed



takes the urine from the mares, and has a loose cover also fitted to it, easily removed for sweeping out when necessary, perhaps once a-week. This system keeps the stable healthy, economises the urine, and the straw also, the latter very important where it can be sold, or consumed as food. The width of 18 feet for the stable gives room for narrow corn bins 3 feet high, so that each carter may have his horses' corn separate.

The ventilation is the most important feature in the construction of the stable ; upon it depends the health of all the horses, and consequently their usefulness. No stable should be without a constant change of air, and no horse in it should feel the draught. The two ends of the stable may be so contrived as to effect this object in this manner. Take 12 feet from the head wall to the opening for the stable-door, allow 8 inches for the two door-posts, and 4 feet 6 inches for the door. This will leave 10 inches between the door-post farthest from the horses and the back-wall. This space, from the ground to the top of the door, should be left open, and covered with strong rabbit wirework, which should be permanently fixed. The door should be 7 feet high, and cut into two parts, horizontally, at a height of 4 feet. The lower part may be kept shut while the horses are in ; the upper 3 feet may be open or shut, according to the state of the atmosphere. Mine are seldom shut, except the wind is blowing heavily in ; we then close that end. There is another communication with the outer air between the door and the ceiling. The opening may be 3 feet long, and so placed that one end is against the back wall. It should have zinc, perforated with a quarter-of-an-inch hole, permanently fastened over it. This arrangement will keep the stable sweet and the horses healthy. I have no communication from the stable to the loft above for any purpose, as I have learnt by observation that this promotes draughts, which are highly injurious to the eyes. The stable should be ceiled, for the convenience of lime-whiting. Plenty of light should be admitted from the hinder wall, by narrow fixed windows here and there, made of slabs of strong glass, never to be opened. Windows opening in bad directions, and open skylights, kill horses by wholesale. The arrangement I have described is suited for ten horses.

Where 18 feet cannot be had, 17, or even 16, may be made to do, by taking 6 inches from the width of the door, and the rest from the space between the door and the head wall.

It is important that the water—of which cart-horses are allowed to drink about as much as they like—should be exposed to the atmosphere at least six hours before they are allowed to have it ; and they should never be allowed to drink till they have eaten something. The colic (commonly called gripes) is almost always occasioned by their taking large quantities of cold water into empty stomachs.

Cart-horses, more particularly than any others, are subject to greasy heels and farcy legs, the treatment of which I leave to the veterinary surgeon ; but my experience has taught me that in almost all cases they may be avoided, by not allowing the farm-servants to wash them in the pond nor in the stable when they return from their work. Neither of these operations would produce the disease if they were rubbed dry immediately, but as it is impossible to get this done, I have stopped the washing entirely ; if the dirt cannot be rubbed off, I allow it to remain on and dry upon their legs. The adoption of this system many years since has completely prevented the occurrence of those diseases.

The temperature of the cart-horse stable should be as little above the external air as may be, to keep the inmates comfortably warm. You should never feel, nor smell, that you are in a stable. The working cart-horse, when turned out to grass in the summer, may have in the stable 8 or 10 lbs. of bruised oats mixed with a little hay and straw cut together into chaff. In the winter time he will consume entirely in the stable, of bruised oats, 10 lbs ; of hay and straw cut together, 7 lbs. each ; of cut roots, 28 lbs., given with the oats and chaff. This style of feeding will cost in summer about 11d. per day for each horse, besides the grass, and 1s. 2d. per day in winter. When roots cannot be had, 1 lb. of dry bran to each horse per day may be used instead. When horses work excessively, a small



quantity of split beans may be given in addition, but I do not advocate this ; I do not like beans for cart-horses, and very seldom indeed give any.

I have now done with the cart-horse, with which I am sure I have severely taxed the patience of my readers, and proceed to another kind of draught-horse, the like of which I think I may safely say there is not in Europe, if there be in any part of the world—the London carriage-horse. I need hardly say how much I admire them ; I feel sure everybody everywhere admires them as much as I do. It is the breeding of them of which I am to write, not of themselves. My observation and experience in breeding them induce me to think they are more surely bred, more easily sold, at an earlier age, with less trouble and more profit, than any other class. They may be bred, too, from mares that can do the work of the farm thoroughly well. The Cleveland bay, the Scotch grey, and the Clydesdale mare, put to the good thorough-bred horse, will all breed capital carriage-horses for the London market. If the mares are well selected, and the high-stepping action not overlooked, very valuable horses indeed may be thus produced. Where this is aimed at, more attention must be paid to fine heads and necks than is necessary for cart use. Thorough-bred mares breed first-rate horses, put to a good cleanly three-parts-bred cart stallion. The young stock intended to come out early, at three years old off, must not be neglected in their early keeping ; if they are, force meat must be had recourse to, and then follow the strangles, distemper, roaring, lameness, &c. &c., which I need not parade before my readers, who are in some instances too well acquainted with them, without, perhaps, having ascertained the cause.

Before concluding with draught-horses, I must not omit to mention what appears to me an important guide in selecting horses for their different purposes. They all have either to draw or carry weight—two distinct purposes. The line of the vertebræ indicates to which of these purposes they can work with advantage to themselves. If the backbone is arched downwards they cannot *carry* weight. If it is arched upwards they cannot *draw* weight. The horse to carry should have the arch upwards ; and the horse to draw should have the arch gently downwards ; in other words, be rather hollow-backed. It took me a great deal of time and trouble to discern this, and I am anxious to impress it forcibly on my readers. I observed that my horses working in harness with low backs were in good condition ; and those with high backs, poor. I saw the fact, but for a long while could not ascertain the cause. What is the cause of this ? is a question I put to myself as constantly as I observed it. At last the answer came, “The bridge that was so strong one way, was equally weak the other.” I wish to illustrate this more clearly to my readers. The bridge arched upwards will carry almost any weight you can place upon it ; turn it upside down, and it can carry scarcely any weight at all. If the horse has to carry weight, and the backbone is arched upwards, it is in the position of the greatest strength ; on the other hand, if the horse has to draw, the forces brought into action will tend to press the spine upwards, and therefore a downward curvature is the most advantageous formation. Horses with high backs cannot push heavy weights back, for the same reason ; the backbone, already bent up, is forced upward still more, the arch is opened, and power is lost. The horse with low back, if willing, can push back almost any weight, because the weight is pressed against the lower side of the arch ; which, being bent downwards, is strengthened by the pressure. Should my explanation not appear clear to my readers, I advise them to put into the plough, side by side, a horse with a high back, and one with a low back, and observe whether the high back does not bend up higher by his work, and whether the low back does not remain in its fixed position. That which bends is weak ; it cannot bear the pressure upwards. The horse would say at the end of his day's work, if he could speak, “How my back does ache !”

The fixed position of the vertebræ indicates the power of the brute as well as the power of the man ; the loose, wabbling back cannot endure in any animal.

The carriage-horse is expected to make a handsome appearance, carry his head high, his knee wellup, and to rely entirely upon his driver where he is to go to



an inch. He is partly blinded by the winkers, and very much prevented seeing his way by the bearing-rein. Not so the riding-horse; his eyes are unmasked, his head at liberty to pick his way for himself and his master too. While the carriage-horse is looking up to the drawing-room window to be admired by the ladies, the riding-horse should be looking where his next foot is to be placed upon the ground to give confidence to the rider. His neck should be lighter, and capable of being easily arched. It is very disagreeable to me to have a high stand-up harness neck before me. I prefer a light neck, not very long, and shoulders so long as that, when I am on his back and he in a trot, I can see his knee at work before me. This gives the rider a good seat, and places the weight well back upon the horse where he can carry it. The hind legs should be well under him, the fore legs short, feet sound, the hips low and flat: wide, high hips are ugly, and objectionable in all horses.

It may be accepted as a rule, "that the horse that walks well can either trot or gallop well;" not unfrequently both. The best hacks I have seen have been bred from good strong pony mares and thorough-bred horses. You cannot have too much blood in your riding-horses; but less can be done with in the hack than in the hunter, in whom pace and endurance are wanted, besides particularly good wind, and also round action, to accommodate himself to ridge and furrow, and carry his master safely home after the sport of the day. The same shape as for the hack is the perfection of shape for the hunter; but a little more length, a little more size, and not less than three parts blood, will be required to go in a good place with hounds: 15·3 to 16 hands is the perfection of size, and quite thorough-bred is the perfection of breeding. The back should be particularly good, the hind legs short, and well under the weight to be carried.

The drainage of the stable of the cart-horse, carriage-horse, hack, and hunter, can all be carried out in the same way with advantage to them all alike: the mangers and hay-cribs should be constructed as already described.

Instead, however, of dividing the standings with bales, as with cart-horses, it is better to have boarded partitions, enclosing stalls 6 feet or 6 inches wide, and 10 feet long. The ventilation should be arranged upon the same principle, with a fixed amount of inlet and outlet, in addition to which another portion, under the control of the head of the stable, may be made available according to the variations of the atmosphere. Horses doing fast work and light of flesh, will bear more warmth than those working slowly. The stable should never be without a change of air. The temperature should never be above 60° Fahr., except when the external atmosphere is above it. Every hunting establishment should have a hot-water apparatus, a plentiful supply of water, and a bath-room to wash the horses in as soon as they return from the field. Loose boxes, 16 feet square, are absolutely necessary in every horse establishment; some of which should be separated from the others for sick horses. I have said something about the necessity of blood in the breeding of horses, but, knowing what I do, I never think I have said enough. I have hinted at the great difference between the want of care and attention taken by the breeders of horses in their selection of stallions as compared with that taken by the same class of persons breeding cattle, sheep, and pigs, and think I have not overstated the truth. Every person who has seen the great change which has taken place in the quality of the animals produced throughout England, Ireland, and Scotland (horses only excepted), will admit that the improvement of them is marvellous; while horses alone have become deteriorated almost in the same degree. Why is this? It is because they have all had more care bestowed upon them: the production even of pigs has been more actively cared for than the breeding of thorough-bred horses (except by racing men for racing purposes). It is simply because the breeders of the inferior animals, since the establishment of Agricultural Societies, have been well rewarded with prizes, while the best thorough-bred horses in England, the most important class to our national welfare, have been very much neglected. The prizes given to every class of bullock, sheep, and pig, male and female, of every age, have so far exceeded those given to thorough-bred horses, that the latter have not been worth competing for. That is not the only reason; there is another important



one. It is that formerly the Royal Plates of L.100 each were given for competition all over England for four-year-old horses carrying 10 stone 4 lbs., five years old, 11 stone 6 lbs., six and aged, 12 stone, and decided in four-mile heats. These prizes were a great inducement to breeders to endeavour to get horses of size and substance, and to keep them when got. As long as these Royal Plates were given to horses carrying these high weights, strong thorough-bred horses were bred and kept, which in the end broke down, and became the most valuable acquisition to breeders of horses in all parts of the country. Having become blemished, they were no longer desired by foreigners, and continued the remaining portion of their lives at home, helping to produce a race of horses with size, substance, blood, and action. From their stock the most valuable hunters, hacks, and carriage-horses were selected, and from the less well-favoured the cavalry was especially well mounted.

Our horses were then the envy of the whole of Europe. These Royal Plates for high weights and long distances brought up our horses to this point of excellence: so long as they were so given, so long we kept our supremacy; but, by some unfortunate influence, the conditions were altered, and lighter weights and shorter distances allowed. From this point I date, under my own observation, the commencement of the deterioration of our thorough-bred horses, and consequently of those of everyday use. I saw the commencement of the evil; I now see the consequence. There was no longer any inducement to breeders to retain their great strong two-year old colts; they could not run at that age, neither could they at three years old struggle with moderate-sized horses. The best horse ever produced in England could not race at two nor at three years old; he was not only the fastest and the stoutest of any period, but he was one of the most powerful—this horse was Eclipse. If he had been of these days, in all probability his fate would have been sealed at three years old; he would have been sold as a great slow brute to some foreigner, coming among us to make such purchases at a small sum, as most of our large-sized, unfurnished horses have been, till there is hardly one left. Since there is nothing further to run for at four years old, they must be sold. I can speak positively from my own knowledge to this state of things; the alteration of these plates, and other Turf arrangements, have combined to produce quite another class of race-horse—a slippery, slender, small horse, that comes quickly to perfection, and as quickly passes away.

The adoption of handicaps at all country races is another evil; nearly all the important races are handicaps, instead of weight for age. This tends to make all horses equal, and give to all, good and bad, an equal chance of winning: speed is substituted for substance; horses are tried at two years old for speed; if slow they are cast, and the expense of training stopped. This promotes sport, and produces betting; and therefore answers the purpose of sportsmen, but it is ruinous to the national supply of horses. Sportsmen are anxious to make their own game; they do make it by these means, but the national interest is not served. The nation should take care that the nation's horses are not ruined by giving money to produce that end. The Royal Gifts were bestowed expressly with the national object of improving our general breed of horses, which was brought to a high state of perfection by the means used. The conditions of the plates were altered, we have failed in our aim, and now have two classes of horses—blood-horses without substance, and strong horses without blood. Both are bad for common purposes. We want the combination of strong blood-horses with the country mares of all kinds. We shall get it by retracing our steps and returning to the old plan—the Royal Plates for four-year olds, 10 stone 4 lbs.; for five, 11 stone 6 lbs.; six and aged, 12 stone—not four-mile heats, as of old, but one four-mile race. This, I think, must be the starting-point, if we are ever to recover our lost position for fine strong blood-horses. Nothing can be expected from Turf arrangements; wretched as the system is, of making good and bad equal, and destructive as it is to the quality of our horses, it does promote sport, and it does produce betting—the final object of keeping race-horses. It would be a great stimulus to the recovery if His Royal Highness the Prince of Wales (who well knows the value of blood in horses ridden across the country) were to add



some Royal Plates for the same high weights, varying the distance to a race of three miles.

The money given by Lords-Lieutenant of Counties, the Members of Parliament, and for town-plates, should all be given with the national interest in view, and this would assist very much to expedite the improvement. This should be followed up by Agricultural Societies' prizes for these horses, as though they were of equal importance with cattle, sheep, and pigs; prizes should be given for thorough-bred horses of three, four, five years, and aged horses, such as have served mares during the season as country stallions, at a country price; blemishes should not exclude; but only lame feet, unsound wind, spavins, and curbs, all of which may affect the rising generation. Prizes for geldings seem to me to be unnecessary, and can have no effect upon the object required.

When a prize of L.100 was given by the Royal Agricultural Society at Battersea, the best stallions were brought from all parts of the country—even a Derby winner, to whom was awarded the prize. Nevertheless, the object of the Society was not obtained. It is not a winner of the Derby or St Leger—a horse that will never be taken from his own stable door—that should come to an Agricultural Show, exhibit himself there, and walk off with the prize; but it is a good strong thorough-bred country stallion that is available for the use of the ordinary mares of the country. This prize did, however, indicate a great fact; a hint suggestive of what may be done by the L.100 prizes towards restoring our losses, and bringing us back again to our original position. It has illustrated the great principle that such rewards are highly esteemed by the owners of valuable horses, and will induce them to keep them to show for such prizes; and there surely is great need of them. The country is so ill supplied with thorough-bred horses that it is almost impossible to find a useful short-legged thorough-bred horse that can carry 12 stone across the country. This loss is immense; there is no substitute for blood; there is no elegant carriage-horse without it, no good quick-stepping hack without it, and no fast, enduring hunter without a great deal of it.

The anxious breeder, who knows the value of it, will say, "Where am I to find it?" I must admit that this is very difficult now; it was not so a few years since. Blood-horses have been getting worse and worse. Great studs of such animals were formerly kept; and many of them, too, in my recollection, all over Yorkshire, as well as in many other counties: they occasionally won a Derby, and not unfrequently a St Leger. Those that were not so fortunate carried their masters with hounds; carried their masters' huntsmen and whippers, and made valuable country stallions. Those bred now are light, weedy, powerless and worthless in every national point of view.

Our cavalry must feel this wonderful falling off. If they should be again brought to contend with some hostile power, it will be seen that although we have not lost the steel of our men, we have lost the energy of our horses. Let it not be overlooked that blood gives pace; pace is power. Blood carries weight; it is said that a thorough-bred horse carrying 32 stone for four miles beat the best and strongest horse that could be found, not thorough-bred. Blood gives life; the thorough-bred horse lives longer in work than any other. Our horses have fallen off wofully since the battle of Waterloo; and those of our friends now, who were opposed to us then, have been as much improved as ours have been deteriorated. The Emperor of Russia also has so improved the horses of His Imperial Guard that I believe he has 10,000 men better mounted than any 10,000 men in England, or anywhere else.

The remedy is in our own hands. Let Her Majesty's Plates of L.100 be re-established for high weights and long distances; let the Prince of Wales throw his influence into the scale, and the nation follow the example,—it is a national subject, and worthy of all the patronage that can be bestowed upon it. The Agricultural Societies of the United Kingdom should follow on with the Royal Agricultural Society, and call for weight-carrying, thorough-bred stallions. We may thus recover what we have lost, and again possess some useful animals capable of doing good service to the country.

Be it ever remembered that, however bad may be the horses available for the



general use, those upon which the cavalry are mounted will be worse still ; whilst, if horses at large are better bred, the army will be better supplied. I have sent six mares fifty miles to a thorough-bred stallion that I saw at Battersea. I would advise any anxious breeder to look at those exhibited at the Royal Agricultural Show, with the view of selecting one for his purpose for the ensuing year ; there are a few left ; but they are very few indeed.

In conclusion, let me remark that most of the observations and opinions which I have expressed have not been adopted at random as chance suggested, but have resulted from what may be called the statistics of the stable. It was my habit early in life to keep in a book for the year a detailed account of every horse I bought, his age, pedigree, colour, quality, defects, and native district, number him, and give him a name significant of the horse as far as possible, to impress him on my memory. These were all entered when he was bought, and the chief incidents of his career were added from time to time afterwards. At the end of the year all these circumstances were brought together, and formed a summary of the year's transactions, consisting of—

The horses bought in.

The horses cast and sold out ; why each was cast and sold.

Those killed accidentally ; how killed.

Those that died ; the cause of death, and where.

At the commencement of the new year all those horses remaining in stock were re-entered by my own hand in a new book, which stated in whose possession they were to be found, with every important particular attached to them for further observation.

As the list always contained several hundred horses, a great mass of evidence grew out of it, which often forced upon my notice views which I had by no means anticipated. Such views, properly grouped and recorded, confirmed by subsequent observation, may be considered as the legitimate laws for the breeding and management of horses, based upon what our neighbours call the logic of facts. And here I will mention one case in particular as to the comparative duration of life of horses. Apart from accidental circumstances, they live longer in the same kind of work, in proportion as they are employed at a pace below what they are capable of going. "Pace kills," is an old proverb, and is equally true as it is old. The cart-horse working in a cart is old at 16, and dies out generally at about 20 years of age. The coach-horse, doing the same work, is old at 20, and finishes his career at about 25. The race-horse working at the same pace will work till 30, and sometimes till 35 years old. Each class must be understood to draw weights in proportion to the weight of the horses. I note these circumstances because I consider, first, that the value of my opinions depends upon their origin ; next, because I hope that others may be induced to follow up the same system of observation ; and, lastly, to give an instance showing how every careful record of facts becomes a substantial contribution towards the advancement of knowledge.

If by my advocacy of this cause I should produce such a change in the system of breeding horses as to recover the size and substance of the thorough-bred horses of the last century, I shall have the pleasure of feeling I have done my country important service.

## PARALYSIS AND GANGRENE OF THE RIGHT FORE-LIMB, WITH OBSTRUCTION OF THE RIGHT HUMERAL ARTERY.

By M. CHUCHU, Student at Alfort Veterinary College.

(*Recueil de Médecine Vétérinaire*, November 1862.)

AN entire Brittany horse was fired at the School for ringbone on the right fore-limb. The limb was disengaged from the hobbles, and had its movements limited by a line put on well up above the knee, but which did not subject the limb to undue constraint. The cauterising the inner side took nearly an hour, during which the animal had violent struggles. The outer side took only a



quarter of an hour, and when the subject was raised, the limb was found paralysed, and could not support weight, but hung flaccid upon the side of the thorax. It was already colder than natural.

Dry friction and the application of oil of turpentine produced pain, as evinced by the head being turned to the limb, but the latter still continued immoveable.

When compelled to move, the left limb was found in a great measure destitute of power. It bent forward at the knee, and could only be placed in an upright position by pressing from before backward on that joint. After a few steps made with difficulty, the animal fell. He was raised, and the same scene repeated, after which he was dragged to a loose box, and in a short time got once upon his legs. Frictions with irritant agents were repeated, which rendered the animal violent and almost unmanageable. On becoming calmer he lay with breathing much accelerated and skin covered with sweat. The teeth were frequently carried to the fired coronet.

At this time the heat of the limb decreased rapidly from the lower third of the shoulder downward.

A vesicant charge was now applied to the shoulder and a bandage to the lower part of the limb, to prevent the patient from biting it. The next day the charge, which had remained inactive, was repeated after the parts had been well rubbed with oil of turpentine. The appetite was retained.

On the sixth day there was considerable swelling in the axilla, as a result of the irritant applications, but no improvement in the limb.

On the seventh day a seton was inserted in front of the shoulder, and produced a sanious wine-coloured discharge.

On the twelfth day the metacarpal and digital regions were of an icy coldness, and the skin covering them discharged a reddish serosity. The epidermis separates easily. Incisions lead, not to bleeding, but to the escape of a serous fluid, with a putrid odour. There was no sensibility below the knee.

The horse was immediately destroyed, and the axillary and humeral arteries were found to be plugged throughout their entire length by a fibrinous coagulum, which extended for some distance into the various trunks to which they give origin. The humeral artery had a brown colour and distended appearance, and felt hard to the touch.

The clot at its lower part was of a deep black colour, and adhered, though not with great firmness, to the inner coat of the artery. At its upper end the clot was destitute of colouring matter, had a yellowish white tint, and was only loosely adherent to the walls of the vessel. A portion extended into the innominate artery as far as the origin of the carotids, but was not attached to its walls, so that the blood passed freely into the latter vessels. The clots extending into the various branches of the obstructed trunk were colourless, and exactly filled the vessels.

The radial, spiral, and ulnar nerves presented in about an inch of their extent a serous infiltration and capillary congestion, quite patent to the naked eye by the rosy colour they presented.

The areolar tissue of the whole limb was filled with acitrine coloured liquid.

From the shoulder-joint to the knee the muscles had a light colour and parboiled appearance, and in some, especially the coraco radialis, points of suppuration could be readily recognised.

From the knee to the foot the tissues had a deep purple hue, and a strong odour of decomposition. The hoof was easily detached with the hand. Around the os coronæ was a deposit of new bone, readily cut with the knife.

The lower third of the second rib on the right side was increased to the size of a man's fist, and contained in its interior a fatty matter similar to the marrow of long bones.

It seems possible that in the struggles of the animal while on the ground, the axillary artery may have got bruised between the costal tumour and the humerus, though it is more probable that the vessel had been previously diseased, and had only become completely obstructed at the time of firing. In the latter case, the likelihood is that the lameness did not alone depend on the existing ringbone,



but also in part on the condition of the artery. In this case, the lameness would increase if the animal were excited, and it is unfortunate that no experiments were made as the effect of different paces.

If it should serve no other good purpose, the above case is useful in this respect, that it adds one more to the many known causes by which an animal may be suddenly rendered useless during an operation.

## PLEURA-PNEUMONIA AND INOCULATION.

*(From the Victorian Farmers' Journal and Gardeners' Chronicle.)*

THE disease in question being, in the fashionable language of the day, "acclimatised" in Victoria, it is not surprising that the means of coping with it has become the most common topic of conversation amongst stock-owners of every grade. In whatever direction we turn, the proprietors of stock—whether of fifty head or of ten thousand—are discussing the merits of inoculation. Those who have tried it under careful supervision and good management, with one accord pronounce in its favour; and such being the case, we may usefully inquire into the value of the evidence thus volunteered, and the extent to which that evidence warrants the general adoption of the practice. It will be remembered that inoculation for pleuro-pneumonia has been opposed from the first by a large number of scientific men, on the ground that its success in the case of an organic disease like that in question, would be entirely at variance with the known laws of physiology. It is thence argued, "that it cannot possibly be of service;" regardless of facts now very well established, that healthy cattle which have been subjected to the operation, have not taken the disease, although running with diseased ones, and that beasts even much affected have been restored to apparent health by its agency. These, we say, are facts, for it is quite useless to deny, as some have done, that the cattle said to have been benefited, could not have been affected with the disease. The remedy has been tried, and proved successful, by scores of persons on thousands of cattle in this colony; it has become generally adopted at the Cape of Good Hope, in Belgium, and other continental states, and this alone we hold to be such proof of its value as a prophylactic, as should silence the twaddlers who still continue to tell us that it cannot possibly succeed. It has been argued against the adoption of the practice of inoculation, that in some cases it has not proved efficacious, but, on the contrary, has caused many deaths, or else materially affected the health of the animal. This was the case at Brussels, at the Cape, and even here, until the proper mode of performing the operation had been learned, but it need no longer be so. The preparation of the lymph, and the method of its introduction, are now pretty clearly understood by the veterinary profession and many others; we no longer hear of twenty or thirty per cent. dying from the attempt to save life, but, on the contrary, letters are constantly appearing vouching for the fact of perfect recovery without the occurrence of a single death! Several letters have lately found a place in our own columns, whilst others may have been met with in those of the Melbourne daily press. Inoculation, then, *when properly performed*, may be relied upon as a preventative. But, for how long? On this point further evidence is much needed. We are acquainted with instances in which it continues to preserve animals from the disease after a lapse of fifteen months; cattle in question frequently mixing with others on commons where deaths amongst uninoculated cattle are constantly occurring; but, beyond that very limited date, we have no certain information. The recent outbreak of small-pox in London has afforded proof of the non-efficacy of vaccination after a certain lapse of time; and observations have induced the medical profession to fix that time in the human subject at seven years. It is, therefore, only reasonable to suppose that a limit will be found to the efficacy of inoculation in pleuro-pneumonia; and, as the average life of a beast is so much



shorter than of man, it would be nothing surprising were the limit in question to prove proportionately brief. This is a point to which we trust the Commission now sitting have specially directed their attention, for it is one way in which they can really be of service to the country. To get at facts bearing on this point should be a prime object of the Commission; returns should be obtained from those who have inoculated, stating date, number operated upon, the result generally, and, where possible, the effect in particular cases. For the publication of all such returns our columns will always be open; and we would remind stock-owners, that in furnishing the information, they are really benefiting themselves. At present we know many desirous of concealing the fact, that their herds have been inoculated, from a mistaken idea that, if publicly known, it would affect their value and prejudice their sale. In the Cape of Good Hope and in Natal, the reverse has come to be the case; inoculated cattle are preferred, and when the value of the practice is more generally recognised, it will be the same in this country.

We have mentioned that the preparation of lymph is now better understood than formerly; and, in the spirit of giving honour to whom it is due, we cannot omit to notice Mr Miscamble of Melbourne, and Mr Mitchell of Donnybrook, as veterinary professors, who have energetically pursued inquiries in reference to this point, until each has attained results that are perfectly reliable. Whether others also have prepared lymph in a portable form we have no information, but it is highly desirable that other persons in distant portions of the colony should direct their attention to it. Bad lymph has been the bane of the practice, and has caused almost as many deaths as pleuro-pneumonia itself. The policy or otherwise of legislative interference to compel stock-owners to inoculate is a question deserving serious consideration. In the abstract, we think, there can be no doubt of the policy of making it compulsory, just as vaccination now is in the case of the human subject. The ignorance and carelessness of many small cattle-owners—and, perhaps, of some large ones too—induce them to neglect the inoculation of their stock, to the injury and loss of the country; for it is not only the owners who suffer—were it so, they might be left to reap the reward of their supineness. Were all the herds inoculated, who shall say that the disease would not, in time, disappear from the country? Such an event would, at any rate, have a chance of occurring. At present, with only partial inoculation, and that frequently improperly performed, there is a certainty that the disease will be perpetuated, and will continue to spread. This no one can contemplate without feeling that a great colonial interest is in serious jeopardy, and that the case is one in which legislative interference would be perfectly justifiable.

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FROM A CORRESPONDENT.

A. sold to B. a horse with the following warranty:—

“B—— Nov. 5, 1862.

“Received of Mr B—— £——— for a Brown Horse 3 years old, warranted sound. “A.”

The horse turned out to be a “Rig,” and was consequently of much less service than if otherwise while in B.’s possession.

Is a “Rig” an *unsound* horse within the meaning of the warranty?

If any correspondent of your publication knows of any legal decision upon the point, and will give it with references, he will much oblige X. Y. Z.

October 26, 1863.

A Rig is not an unsound horse within the meaning of the warranty as above. We shall be happy to publish any reply to the foregoing question, if any such be sent us by our readers.—ED. *Edin. Vet. Review.*



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### ORIGINAL COMMUNICATIONS AND CASES.

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*On the Importance of Legislation for the Prevention of Disease amongst our Domestic Animals.* By JOHN GAMGEE, Principal of the New Veterinary College, Edinburgh.

GENTLEMEN,—If I look back to the day when I opened the last Winter Session, it is truly difficult to realise that the time since passed amounts to an entire year. If, however, the months have seemed as weeks to us, the events that have marked their passage have been of much importance to the veterinary profession. Great calamities are often the precursors of great reforms; and the plagues which originally led to the establishment of the first Veterinary College in Lyons, one hundred and two years ago, have turned the attention of social reformers and Government to the study of measures which might be adopted for the preservation of the health of our domestic quadrupeds. No sooner had I been intrusted, in 1862, with a general inquiry into the diseases of animals in the United Kingdom, in relation to the supply of animal food for our people, than the outbreak of smallpox in sheep afforded me an excellent opportunity of demonstrating what serious losses were sustained in this country through the importation of infected stock from abroad. We can now point to the Wiltshire outbreak as an excellent illustration of the value of preventive measures in arresting the progress of the most fatal and contagious epizootics. We can adduce instances of great destruction due to negligence and mismanagement, and of great saving of life and money as a reward for a little care and intelligent interference. If the few gentlemen north of the Tweed who wish to stir up opposition to any proposal having for its special object the prevention of contagious diseases, are at all disposed to consider in a becoming spirit how I wish wide-spreading plagues to be dealt with, let them read the history of the Wiltshire outbreak. We soon put an end to the spread of the disease: we locked it up on the farms where it broke out. We prevented the sale of diseased sheep; and whereas the losses on the farms which suffered prior

to my visit to Devizes amounted to 20 per cent., the total deaths on the flocks I had to deal with only amounted to 1·6 per cent. These facts were brought under the special attention of Parliament during the past session by the Vice-President of the Privy Council; and in the face of such statistics, it cannot be said that we are powerless in dealing with malignant epizootics.

The first outbreak of smallpox in this country, in 1848, led to the passing of an Act which refers more or less vaguely to contagious diseases in general. That Act has been found deficient; and in consequence of the difficulties experienced at Worcester in controlling the traffic in diseased animals, in the vicinity of a site selected for the last Show of the Royal Agricultural Society, Mr Holland, one of the Members of Parliament for the county of Worcester, and a Member of Council of the Royal Agricultural Society, introduced a measure into Parliament last session, "which it was thought might, if it became law, save the breeder and grazier from the enormous losses to which they are now liable through death from contagious and infectious diseases amongst their stock." Mr Holland's efforts have led to the exacting a pledge from Government that, in the course of the ensuing session, a more stringent measure than the one in force will be framed.

It is to me a source of special satisfaction that this important question is now receiving so large a share of public attention. The earlier agitations which had a tendency to influence the public mind on this very subject led to the establishment of this College. From the first we have declared that the veterinary profession has not been well led in this country. Its efforts have been misdirected, and instead of disease amongst animals having diminished in amount as the number of veterinarians has increased, it is a positive fact, that the mortality has attained higher proportions of late years than it had perhaps ever reached in former times. It is not my intention to blame the veterinary profession as a whole. We have a much larger number of skilful practitioners now than ever we had before; but like any other body of men, in order to accomplish much good, they must be under good generalship. The members of the medical profession were long since far more numerous than veterinary surgeons ever will be in Britain; but well-directed efforts for the prevention of disease only date back a few years, and not many of our leading sanitary reformers are yet cold in their graves.

Amongst the first of these sanitary reformers was Edward Coleman, Astley Cooper's bosom friend. I have often had to criticise his acts, but no doubt he was one of the first men to raise a loud voice in favour of ventilation; and so firmly did he believe the doctrines he promulgated, that not only did he prefer to treat horses with every form of acute disease in open sheds, but on his deathbed he called out that his windows might be left open, as the surest means to prolong life to the utmost. Edward Coleman stirred up the London physicians as much as he did our army men, and I have



to-day to repeat what I said a few days ago in London, that veterinarians have found themselves capable of achieving great victories in preventing disease, when we consider how small the mortality is now amongst our army horses as contrasted with the time when Coleman first moved in this matter, and as compared also with the losses sustained in foreign armies. The handful of veterinarians in our cavalry regiments, made to work together under a single guiding head, and employed more to prevent than to cure disease, have accomplished the task of almost exterminating so malignant a disorder as glanders, and to a great extent preventing the occurrence of many other fatal maladies.

What has been accomplished in the army, I want to see in full operation over the whole of the United Kingdom, and in order to obtain this, we must have legislative interference. We must have something more. We require a large body of veterinarians ; but our numbers will very rapidly increase if it be shown that there is profitable employment for well-educated men. A few years ago I drew attention to the fact, that the number of veterinarians in this country was much below the number in continental states, where stock was not so numerous nor so valuable. During the past year the Royal College of Veterinary Surgeons has issued an official statement on this subject.

We have 1018 qualified veterinarians to attend to the health of nearly three million horses, upwards of seven-and-a-half million head of cattle, 40 million sheep, and four million pigs. The thing is quite preposterous. Ireland is writhing under misfortune, and she has 36 veterinarians to attend to the health of an aggregate amount of stock valued at L.29,997,546 ! Is it to be wondered at if we are told that there are five or six unqualified practitioners for every qualified veterinarian in the United Kingdom ? How to remedy the evil ? If young men will not enter the veterinary profession law cannot compel them. Quite true ; but the strong incentive to induce men to work at any subject is to make it worth their while. Provide livings for them, and then the number cannot long remain short of the requirements of the age. At the present time veterinary surgeons throng to the large towns to treat horses. They are well paid for that work ; and the result is that the county of Middlesex has within it 103 qualified veterinarians and 112 unqualified ; whereas the whole of Scotland numbers only 164 qualified veterinarians and 84 unqualified ones. There is another startling fact worthy of special consideration. In large towns, cattle are dying off at the rate of thirty, forty, and fifty per cent. It is there that there are most veterinarians, but they are rarely if ever seen in a cow-house. Why ? In the first place, because the butcher is said to be the best doctor ; and in the second place, because the prevention of disease has not been attended to by those who should long since have exerted themselves for this purpose. Individual practitioners cannot battle against plagues which sweep off cattle almost as rapidly

as they might be cut down with cannon shot. It is essential in such cases to organise measures adequate to great emergencies ; and it is ludicrous to think that physic is to save the lives of hundreds upon hundreds of cattle, which we should and could preserve from any attacks of the kind so common at the present day.

All this shows us that veterinarians may be at hand, but useless unless made to work on a proper system. Imagine how powerless our medical men would be, however numerous and however learned, if smallpox raged in London and vaccination had not been discovered. The mortality would not be far below that at present to be witnessed amongst the cows in the London dairies ; and the same remarks apply to all our large cities. We have heard too much of late of small-pox epidemics ; and what has been the cry raised by the Faculty?—"Vaccinate and ventilate." Keep yourselves clean, but above all things "*get vaccinated.*" And so with regard to animals. We should not abuse the dairyman and tell him to pay long doctors' bills in addition to losing his cows. We should prevent disease ever getting to the dairyman's sheds, and this can be done for the dairyman though he may not have the power to do it for himself. All he can do—and does—is to make us eat his diseased cows in return for neglecting to provide means to protect the health of stock,—means as certain in their results as the prevention of human smallpox is certain if you vaccinate.

When, therefore, you have veterinarians, you must learn how to use them ; and as a first instalment of the good treatment which is to encourage the growth of a useful profession, I think it is high time we were granted some decided privilege ; and just as physicians and surgeons are protected from ignorant pretenders living next door to them, and calling themselves physicians and surgeons, so do I think that Government should protect the Veterinary profession so far as to put a veto on the assumption of a title by persons whose first object is to mislead the public, and efface the distinction between properly educated and uneducated practitioners. The active President of the Royal College of Veterinary Surgeons has prepared a draft of a bill to secure such a privilege for the Veterinary profession, and he has done so in a manner to overcome every objection. No person or class of persons can consider himself or themselves aggrieved by the measure.

I am one of those who believe that quackery must die out when qualified men exist in sufficient number and possessed of a substantial education. But on the other hand, half-a-dozen quacks, which a young veterinarian may have to fight with in starting in practice, are likely to ruin a heavy percentage of tolerably able young men, who may be more distinguished for intelligence than for endurance, under the trying hardships of waiting months and years before they can make ends well to meet. We do not ask for much, and the little we ask for should, and I have no doubt will, be conceded.

One of the first steps then, in legislation, with a view to the pre-



vention of disease, is to favour the progress of veterinary science and art, by securing to its students and practitioners privileges which they are justly entitled to, and without which our profession exists only in name. Improve the status of the veterinarian, and we shall soon see well-educated men devoting their best attention to the study of the diseases of animals,—a study of engrossing interest and surpassing difficulty.

But the next step, and the most important of all, is, that the British Government and the British people should encourage the appointment of veterinarians over the whole country, with a view to check the spread, and report on the existence of diseases of all kinds amongst our domestic quadrupeds. Sooner or later this must come to pass, inasmuch as the veterinary profession is perfectly useless in its present divided and scattered condition, in dealing with the questions of real importance to the farmer and the public generally.

In order to show up in clear light how veterinarians should be made to work, let me turn your attention to those vast flocks which enable us to clothe and to feed our people, when the produce of cotton fields is kept from us by a disastrous war. What should we do in this country without our sheep? What would Scotland be but for its five or six million sheep? What would that food and wool producing county of Lincolnshire be without its hundreds and hundreds of thousands of sheep? Ponder over any statistics you like, commercial or agricultural, and you must plainly see, that our precious soil would lie waste, and the British Isles would cut a sorry figure in the world, but for our flocks—but for our hardy Black-faced and our magnificent Cheviots, our long-woolled Lincolns and flesh-making Downs. Look at the wretched sheep imported. A few are respectable offsprings of British sheep, exported to Germany; but when will you ever produce in the frost-bitten fields of the European continent sheep such as those which tread the grassy hills and luxuriant plains of England and Scotland? I say never. We do not need to box our sheep in filthy and disease-generating stables for half a year. Our sea-girt islands are in a warming-pan, which can never transmit its heat to the piercingly cold sheep-rearing districts of Hanover and Prussia, of Austria, and the dominions of the Czar. We are apt to speak of Britain as richly endowed from the perseverance of its people, rather than from the natural gifts of Providence. No greater fallacy. What do we owe our magnificent horses to?—soil and climate. What do we owe our short horns to?—soil and climate. What do we owe our superb sheep to?—soil and climate. People Italy or France with Englishmen—with enthusiastic stock-breeding farmers—and you will fail to obtain there what you have here,—viz., the finest stock that the world can produce. Knowing this, is it not painful to reflect on the fact, that we care not how speedily our animals are destroyed by disease. Is it not disgraceful to neglect the investigation of diseases which are annually curtailing the capabilities of these islands for the production of food for their people.

If our labourers are not well fed, what can we expect from them? I am a firm believer in some of the views entertained by Professor Christison, as to the dependence of malignant epidemics in man on the want of food. We have the typhus of famine-stricken lands, and hundreds of thousands of people in this country are prematurely lost to us in consequence of the extraordinary price of provisions, and especially of the price of the real blood and bone-making aliment,—viz., meat.

I believe it is impossible to bring out the real facts of our position in relation to the prevalence of disease amongst animals better than by devoting a short time to the consideration of sheep diseases. In my Government Report, I estimate in round numbers the annual loss in money from disease amongst our sheep at L.1,600,000. This is far below the mark. However alarming my statistics have been, they have all been framed so that, with a closer investigation of the subject, it may be found that I have erred on the safe side, and never used sensation figures. I can easily show you how much within the mark I am as to the losses amongst sheep. The information I have received from all the farmers in Scotland, who are acquainted with this subject, tends to prove, that on a flock of sheep the loss is very rarely less than one per score, and often up to two, three, and even five per score. A short time since I was favoured by the Secretary to the Hungerford Farmer's Club with statistics referring to twelve farms for the six months ending the 1st of June 1863. The gentlemen who supplied the returns had instructions to keep a record for six months of the numbers in each flock; the loss in sheep and lambs; the date, and the cause, of death, to the best of the reporters' judgment.

The losses in six months were as follows:—

1.	On	555	14,	or at the rate of	5	per cent. per annum.
2.	„	210	31,	or „	29·5	„
3.	„	386	21,	or „	10·8	„
4.	„	615	18,	or „	5·8	„
5.	„	832	25,	or „	6·	„
6.	„	568	63,	or „	22·2	„
7.	„	614	45,	or „	14·6	„
8.	„	250	21,	or „	16·8	„
9.	„	420	37,	or „	17·6	„
10.	„	220	4,	or „	3·6	„
11.	„	837	31,	or „	7·4	„
12.	„	287	9,	or „	4·6	„
<hr/>						
Totals,		5894	319,	or „	10·8	„

Here we have the statement of twelve farmers whose names and farms I know not; but as Members of the Hungerford Farmers' Club, they depute their Secretary to send me the above item of information, in reply to an expressed desire of mine to get some statistics. There are those who might suppose that on the above twelve farms there must have been some plague. Not at all. The sheep and lambs died of ordinary diseases, and such decimation—nay, more—is going on throughout the length and breadth of the United Kingdom.



I will give you a few more statistics such as the above, before stating the causes of death amongst these flocks :—

One farmer in Lincolnshire reports his loss, in 12 months,

On 465 lambs to be 62, or 13·3 per cent.

On 620 sheep „ 29, or 4·6 per cent.

Another farmer in Cambridgeshire reports a loss of 6·4 per cent.

A third farmer in Buckinghamshire reports having fortunately escaped without *usual* losses, and on an average amount of stock of about 350 ewes and lambs, he lost 11, or 3·11 per cent. This is looked upon as absolutely no loss at all.

*Lastly*, a Caithness farmer, who speaks of the unusual very low mortality, reports a loss of only 16 animals on 1095 in a whole year.

These are the numbers I can give you just now, to demonstrate the truth of what I have before stated ; and it transpires that on 8924 sheep on 16 different farms, and in at least five different counties in England and Scotland, we have a loss of about 8·5 per cent. On one farm, as a great exception, there is a mortality of only 1·5 per cent., whereas on others the losses amount to nearly 30 per cent.

It is worthy of very special remark, that the farmers who have reported their stock to have been healthy state that it has been quite unusually so ; therefore health is the exception and disease the rule. Does this not show, when I estimated the loss amongst sheep in the United Kingdom at 5 per cent., that I was far within the mark ? I have no hesitation in saying that the average loss is usually above double that.

In none of the reports above referred to is there any mention of the disorders that commonly tend to destroy heavy percentages of sheep. There is no smallpox, no scab, no rot, no parasitic lung-disease. A list of the diseases named by the farmers is very amusing and highly instructive, as showing the state of knowledge on the subject of sheep disease.

Thus they speak of—

Abortion.  
Apoplexy.  
Blood, or Black Quarter.  
Blowed.  
Braxy.  
Casualty.  
Canker.  
Choked.  
Chilled.  
Cold and Inflammation after Washing.  
Consumption.  
Debility.  
Decline.  
Diarrhoea.  
Diseased Joints.  
„ Liver.  
Dropsy.

Dwindled away.  
Frenzy.  
Gathering in the Head.  
„ „ Back.  
Giddy.  
Gogly.  
Heaving Pains.  
Inward Scour.  
Inflammation.  
Inflamed Bladder.  
Inflammation of the Bowels.  
Lambing.  
Overflow of Blood to the Head.  
Ricketty in the Back.  
Stoppage.  
Scour.  
Weakness.

When I look over the list of cases as reported to me, I find some due to overfeeding, others to ignorance in managing animals at the period of parturition, not a few to want of a little medical knowledge, which might suggest supporting debilitated animals, and there are many cases due to unknown causes which ought to be investigated and guarded against when discovered. One of the farmers who has favoured me with statistics says in a note, "It has often been a matter no less of surprise than regret to me, as I make no doubt it has with many others, that the diseases of sheep should have been so much neglected. Most assuredly they deserve, and have a right to claim, a greater share of professional attention than they have ever yet obtained." No doubt whatever of this, I say. But why do medical men investigate human diseases?—because they get a living in practice. Why do veterinarians attend to horses?—because it pays. Only make it pay, and you will soon find sheep diseases attended to.

But before referring to the employment of veterinarians to study the maladies which decimate our flocks, let me turn your attention to sources of loss by deterioration from diseases which are not necessarily fatal. The losses sustained in this way are certainly the most severe in a number of counties in the United Kingdom—and this notwithstanding that a law exists to prevent the sale of sheep affected with contagious disorders. I have to allude specially to scab in sheep. I am personally acquainted with some of the richest sheep-grazing districts in Britain, where, from this cause alone, farmers are losing 10 and 20 per cent. from deterioration of wool, and the animals not feeding. Three and four farms, all clustered together, might be pointed out in a dozen different places on which between eight and nine hundred sheep are to be seen scratching from morning to night, wasting in flesh, and losing their precious wool. The farmer tries one nostrum and then another. He fails, as a rule, to cure his sheep, and, according to universal practice, sends them to market. Few markets and few railway trucks exist in which sheep may not catch the scab; and if you travel through the counties of York, Lincoln, Rutland, Leicester, Cambridge, Essex, &c., &c., you learn of tons upon tons of ointments and dips being sold which are more successful in killing than they are in curing. Many persons might, of course, travel through these counties and never hear of such a disease as scab; and why? because farmers are ashamed of it. They keep the matter a secret, and try their best to cure the disease. And it continues sometimes better and sometimes worse. It goes on year after year, and no professional man is ever consulted. Sheep dressers and chemists are resorted to. In one town they try blue ointment, which does not answer. They go to another chemist to get the right sort. They then try a dip; and so they waste money and tire their patience out until they swell the diseased markets with their scabby flocks.



Is it not evident that if there is something to be ashamed of in having a scabby flock, it must be the farmer's fault that he has the disease? Often it is his fault. He is negligent, and has a useless shepherd; but at other times it is the farmer's misfortune rather than his fault, that a flock of apparently healthy sheep, purchased in a market, turns out scabby when taken home.

It is to the farmer's interest that this disease should be studied and prevented. We know the cause of the disease; and that cause is an insect, which we now allow to live, to breed, and to multiply, almost unmolested. That insect robs the Lincolnshire farmer alone of upwards of L.50,000 per annum. It is not an indestructible insect, for it can be killed with certainty; and if we only hunted it down wherever traces of it appeared, we might not only render it very rare, but almost place it amongst the extinct animals, so far as the British Isles are concerned. It is not true that the cause of scab is wet and dirt. It is the purchase and sale, the travelling and trucking, the shipping and driving of scabby flocks over the whole country.

What do the farmers do to prevent the scab? They dip, they smear, they pour and spend money, as a rule, to no purpose. They have a class of men smearing their sheep, who are like the rat-catchers; these men, afraid that if they clear a house too thoroughly, they cannot get another job soon, take good care to leave a rat or two behind them; and many of the miserable-looking sheep-smearers only half do their work, and, on leaving, suggest "That it is likely the sheep may need another touch."

All this is reckless tampering with dangerous matters. The farmer loses and the country suffers, and so it may continue to suffer if the veterinary surgeon is not utilised in a very different manner to that in which he has been utilised hitherto.

It is quite evident, then, that the losses in this country by preventible disease are enormous. That the veterinary profession has not been employed to prevent disease; but the few veterinarians we have have attended to their own interests by studying the diseases of animals for the treatment of which they were likely to be remunerated. That without some special effort the important diseases of cattle, sheep, and pigs, which are ruining stockowners, keeping up the price of meat, and generally deteriorating our meat supply, must continue unstudied and uncared for.

How are we to correct the grand anomaly, as it has been called, of the four-pound loaf at 5d., and the pound of meat at 9d.? I say, by the prevention of disease. Let the landowners and farmers in their respective counties combine to pay for scientific investigations, and for the constant devotion of enlightened labour to the study and prevention of epizotics. If they expect a class of philanthropic veterinarians to start up and starve on the hills where sheep maladies abound, just for the sake of benefiting mankind, they must wait in vain. If they think a busy practitioner in the heart of Lincoln-



shire or Berkshire is going to spend a couple of months in researches on the scour of lambs, or the heaving-pains of ewes, merely for the love of science, they are wofully mistaken ; but what would it be for any county to provide funds for the constant employment of the best men in the land to keep disease at bay? As an illustration of this, I may take any of the Irish counties where veterinarians now starve. Is it likely that fees are to be had from the famished cottager whose pig is dying, or from the poor man who loses his all when he loses his cow? A small sum of money raised over the whole county would maintain a veterinary practitioner who might, however, be made to work so as to secure a constant diminution in the number of deaths amongst such animals. A Caithness proprietor was lamenting to me a few days ago that in his district animals were carried off daily, and no veterinary surgeon was to be had. He had, in company with other gentlemen, raised a sum of money to keep a veterinary surgeon until he got into fair practice, but all to no purpose. The district was wide and poor, and professional men could not make a living there. Nevertheless, gentlemen, in such a county as Caithness, a handsome salary would secure the services wanted. It is no use paying little and getting a middling man. A very able man would find resources in the county by studying the diseases of all animals, and would not wish to leave if well paid.

To secure, however, the services of such men, we should have fixed Government appointments, with salaries supplied in part by the public treasury, but principally by the local authorities, wherever the services of the professional men are required. In Prussia and elsewhere, for example, there are veterinary surgeons holding such appointments in every district ; and the result is, that the diseases of animals cannot be neglected. I was much struck, when at Hamburg in July, at the very deep interest manifested in epizootics of all kinds by the Members at the International Congress of Veterinarians.

Amongst my efforts to secure co-operation in the great task of checking the spread of cattle and sheep plagues, I issued a circular last March, calling together veterinary professors and practitioners from all parts of Europe, to meet at Hamburg during the week of the Agricultural Show. My appeal was responded to most cordially, not only by the members of my profession, but by the emperors, kings, and grand dukes, of a large number of European states. Not a few distinguished veterinarians had not heard of the Congress taking place before receiving an order from their respective Governments to attend officially. Russia sent us no less than four representatives, Austria three, Prussia three, Bavaria three, and others attended from Hanover, Saxony, Würtemberg, Baden, Switzerland, Denmark, Norway, and Sweden. Altogether, about one hundred and fifty veterinarians assembled, including by far the most distinguished men we could possibly bring together at the present time on such an occasion.



Allow me to give you an indication of the nature of our meeting, by quoting a few words from the concluding speech by the learned Hering. He says, "It is manifest, both from the nature of this meeting, and from our special position, that we can arrive at no other than purely scientific conclusions, and that it is only in the power of governments to call these into positive existence for the wellbeing of mankind. Scientific men—nay, the different scientific bodies—have ere now arrived at similar conclusions, whenever their attention has been directed to questions such as those which we have discussed; but this result has been always viewed as merely one of but little more weight than if emanating from any individual. Now, for the first time has a meeting taken place, and resolutions been passed, which have a hitherto unknown value and influence. We openly proclaim the high importance of our mission; and no government will ere long be able to turn a deaf ear to advice which is founded on so broad a system of inquiry. For the first time has our profession drawn upon itself the earnest attention of governments and rulers. Could we adduce a more striking proof of the importance of our labours than the discussion referring to the Russian plague, and the valuable suggestions to prevent smuggling of infected cattle through the Austrian and Prussian frontier, a result hitherto unattained by the military cordon system? What heavy losses are sustained by many European countries through the wide-spreading lung-disease, and what gratitude should we merit could we but completely eradicate this plague! The ever-increasing transport of cattle, especially by railway, threatens, it has been rightly observed, to break down every barrier which we endeavour to oppose to the dissemination of cattle plagues; and more caution than ever has become necessary as to our modes of conveying cattle. It is of vital importance, at any rate, that where a plague has broken out, it should be restricted, in the shortest possible time, within the narrowest possible limits, in order that the innocent should not suffer for the guilty. That this is not possible, without a strictly organised system of sanitary regulations, is self-evident; and thus is it all-important that the Congress has arrived at some positive conclusions as to the diseases which call for Government interference."

These words, from the President of our first Veterinary Congress, are full of truth and full of meaning. The effect which he states our resolutions would have on governments has been already experienced abroad, and they have not altogether been passed without producing an impression here. We have, however, been less prepared for action; and it is not with us as elsewhere, that a king can give instant effect to measures which he may deem of value to his country. I have abundant experience of how slowly we creep here; but advance we do; and no better evidence of our progress could be adduced than the spirit in which both Mr Holland and myself were recently met in discussing this subject, both in Edinburgh and



London. Whether I look back to the meetings I have attended during the past year, or to the many occasions on which the public press has helped the cause I have at heart, I cannot but experience a lively satisfaction at the progress of public opinion.

And now I may specially address a few words to the students who assemble here to commence their career in the veterinary art, whose prospects are bright just in proportion as they will work and deserve success, and whose opportunities are likely to be greater than those of their predecessors.

I wish to impress on their minds, that they are destined to follow a noble calling. One which will tax their intelligence and energies to the utmost, and which calls for steady and constant labour from the first day of entering college to the last that they are engaged in practice.

To be an able and successful veterinarian, it is essential to be a good anatomist, and be well acquainted with chemistry, botany, physiology, and materia medica. I find that a knowledge of geography and geology are of the highest importance to enable us to trace out the distribution of disease. We learn thus the real causes of wide-spreading plagues; and though some knowledge of the first science may have been acquired by you at school, the last-named science—geology—as, indeed, also botany, many look upon, but very wrongly so, as a superfluity. The principles and practice of veterinary medicine and surgery can only be correctly acquired by those having an extended knowledge of the elementary sciences I have alluded to. The more perfect your knowledge of the rudiments of your profession, the greater the pleasure and the more brilliant the success which you will experience during your professional life. I take it for granted that you all come here imbued with proper feelings, and a rational determination to do your best as veterinary students. If I have to impress any point specially on your minds, it is that of working patiently. Be not too anxious to learn all at once. Do not try to hasten to the end. And although it is not a good sign for a student to be satisfied with himself, I would ask you to be always happy when day by day you have really acquired something new. At first you will learn but few truths in a single day; but they grow like a ball of snow, which, descending from an Alpine summit, is large enough in the valley to bury a town. Your minds will grow in a similar manner, so as to enable you to conquer almost insuperable difficulties. But rest assured, that if you pass a single day without learning something worth knowing, you are sure during that day either to forget something, or to learn that which you had better not have known. Idleness is truly the parent of vice and ignorance. Healthy recreation, on the other hand, invigorates you, and makes you relish heartily the intellectual meals which you partake of in the lecture-room and in your study.

A shattered frame destroys your usefulness, however much learning you may acquire; whereas health and vigour are essential for the



inspirations and the efforts of a vigorous mind. Unfortunately, our youths, perhaps, oftener lose their health by dissipation than over work. You have been warned against the one by those who have had charge of your moral training; I warn you against the second, inasmuch as I have on more than one occasion mourned the loss of a student and a friend whose unremitting exertions have proved deadly to him in very early life. Do not come here in the morning at a little past nine sleepy, and having worked or amused yourselves during the greater part of the preceding night. My experience is that young men need sleep, and especially what the ladies call beauty sleep, before twelve o'clock at night. Then you can be fresh for your first lecture, and you are not likely to forget what you hear the first thing in the morning.

Each of you, according to his tastes, must frame for himself a system of work—but let it be a system. Method is to knowledge what the lever is to force. Be regular in all you do, and you will acquire habits of industry and punctuality, which are sure to be of the greatest benefit to you in after life. Here you will find every assistance, and every encouragement, for work. On the other hand, the surest way to get the cold shoulder is to be idle and ill-behaved. We help those who help themselves; and you will find that all students are treated alike. There is no partiality—no favouritism. To each and all of you I can give a hearty welcome, in the hope that you may all hereafter be an honour to yourselves, your families, and this College.

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*Lecture by PROFESSOR BROWN, late of Cirencester, on the Veterinary Art in Relation to Agriculture. Delivered before the London Farmers' Club.*

PROFESSOR BROWN said: Mr Chairman and Gentlemen,—It is not difficult to understand why in all periods the practical has been popularly preferred to the theoretical. There is something especially satisfactory in evidence which addresses itself to our senses. That which we can see and touch is not a matter for speculative discussion; while the conclusions of the philosopher, however rigidly deduced, do not appeal with the force of truth to the uncultivated intellect. Between practice and theory the difference is, however, really one of degree. The practical man must think—that is an absolute necessity of his intellectual being; and the veriest theorist must in some degree act in obedience to a necessity of the physical constitution. The two things are, however, opposed; and in proportion as a man excels in the one he is deficient in the other. The constant application that is necessary for the attainment of great physical tact is opposed to an exclusive cultivation of the intellect; and, on the other hand, constant indulgence in speculative and abstract reasoning is opposed to the attainment of any great

degree of physical excellence. Man thinking and man acting will always be distinct; they may move in concert, but they will never become one.

A large part of our discussions at the present time seems to me to arise from a want of distinct comprehension of the terms we are in the habit of employing. We hear of art, science, practice, theory, philosophy; but there has yet to arise the authority that shall give these terms a precise meaning. They express your ideas or mine, as we think proper to use them; and there is no possibility of deciding in what particular line, as it were, our minds shall think. In fact, many of our discussions are admirably illustrated by the fable of the two knights, who, by chance, were resting on opposite sides of the same shield. The shield was composed, as you are doubtless aware, on one side of silver, on the other of brass. In a discussion between the knights on the material of the shield, allusions were made by each as his senses dictated. A dispute consequently arose, and in the strife which resulted, it turned out that the combatants had been cutting and hacking each other because they happened to be on the opposite sides of the shield.

We have before us to-night, gentlemen, two subjects of an eminently practical character—agriculture, and the veterinary art. However distinct these may appear now, there is a connection between them, which will be obvious enough if we trace them to their origin. If we could go back to the time when our first parent, that “grand old gardener,” as Tennyson calls him, turned the first clod of earth, and thus laid the foundation of the agricultural system, and if we could trace agriculture through each successive step up to the present moment, what a wonderful history it would be! How interesting it would be to watch the gradual dawning of facts, one after another, on the slowly-awakening human consciousness—the growth of plants, the influence of the seasons upon them—the discovery of the astounding fact that soils, after a certain time, would lose their fertility, and not regain it till after a long period of rest! We can imagine how it was found out that in the excretion of animals there existed a remedy for the loss of the fertilising power, and that there was thus laid the foundation of the system of manuring. We can conceive how, gradually advancing, men discovered how each man could appropriate a certain portion of land to his individual use for a time, and allow the remainder to continue in its natural state till it had attained the requisite properties; how, gradually advancing on this, it became the province of the science of chemistry to show that, by giving to the soil the materials on which plants required to feed, an almost *ad libitum* supply would result. Doubtless a problem remains yet to be solved—it is for chemistry to solve it—how, by adding in the form of artificial manures to the soil, we may do away with the necessity for fallowing, so that we may no longer have cause to regret that soils lose their fertilising powers by long use.



But, gentlemen, it is not alone to the cultivation of the soil that agriculture is required to devote attention ; it has also to deal with flocks and herds—to supply the people with animal as well as vegetable food. And we may well imagine that, in primitive times, when so large a proportion of the wealth of the country consisted of flocks and herds, the first inroads of disease must have struck the agriculturist with alarm—how he must have been forced to exercise his ingenuity in the selection of healing plants ; and how, by gradual efforts and very doubtful success, the veterinary art arose (as it unquestionably did) out of the science of agriculture. As civilisation advances, the two things become distinct. The veterinary art, no longer being in the hands of the farmer, became the property of the ignorant and uneducated, so that the name of horse-doctor was an opprobrium. Thus we might trace its struggles through various stages of existence up to the present century, when it took its place as a distinct profession, with its schools and colleges, enlisting among its members men of education, and ranking fairly as one of the liberal professions.

But, though a good deal has been done by veterinary science, it is a melancholy fact that the stock of the country has not experienced an amelioration in proportion to that of other departments. Statistics inform us that an enormous percentage of animals die yearly from diseases which veterinary science seems powerless to remedy. This is not satisfactory to reflect upon. Bearing in mind the enormous influence on the prosperity of the community which agriculture must always exercise, particularly in a country like England—recollecting the effect on the health of the people which must inevitably be exerted by the condition in which meat is sent to market—it is certainly not satisfactory to reflect that so enormous an amount of disease exists among agricultural stock as is known to prevail at the present moment, and has prevailed for a considerable period.

Now, in endeavouring to find a solution of this difficulty, one is forced to the conclusion that agriculture has not availed itself to the extent that it might have done of the improvements in the veterinary art. I am speaking from experience of considerable extent in an agricultural district when I assure you that the stock of the country is not in the hands of educated practitioners. The number of those who are practising, so to speak, without a licence—the number of those who are uneducated, uncertified, and, in many respects, unfit to attend to so important a matter as the health of the stock of the country,—is more than double that of the certified practitioners who have emanated from one of the colleges. This fact was brought out through the labours of the Secretary of the Veterinary College in London, at the last meeting of the members of that institution. In my own visits to farms in various parts of the country, I have constantly met with men of the class to whom I have alluded. Personally, one has of course nothing to say

against them ; they are as much justified in getting their living in their way as we are in getting our living in ours ; but that is no reason why they should be left by farmers to do the amount of mischief that they unquestionably do,

I am free to admit that the ravages of epizootic diseases are altogether irremediable by medical treatment. Beyond all question the attacks of such maladies as pleuro-pneumonia and small pox in sheep are beyond the reach of the veterinary practitioner. Science has not yet discovered a remedy for either of them. But under a properly regulated system they could never have done the mischief in the country that they have. For example, a certified inspector is sent for to inspect a farm. The tale has gone forth that pleuro-pneumonia is there. Thinking calmly on the matter, one is often tempted to smile at the whole affair. Reports go forth that on a certain farm pleuro-pneumonia has appeared, and that by well-directed efforts on the part of the owner its ravages have been stopped. Gentlemen, such a thing has never happened yet. I have myself been called in, in some of these supposed cases of pleuro-pneumonia. After walking among the stock, I have said to the owner, " I do not discover any signs of the disease ; on what is your opinion founded ? " The reply has been, " These animals showed certain symptoms, we treated them in a certain way, and the disease stopped." I have inspected the remains of animals that have died, and found nothing of the disease. In one case a gentleman had been induced to fumigate his sheds with vapour of tar, or something of that kind, as a specific for the malady, and he told me that by so doing he had saved all his stock with the exception of one animal. That one I have no hesitation in saying he had suffocated (laughter). An animal might have had a cold or a cough, but I am enabled to say that there was no case of pleuro-pneumonia. Cases like that to which I have thus referred are not uncommon. One sees receipts constantly given which are of no use ; one sees some trifling application in the nature of fever medicine, nitric ether, simple nitre, or something of that kind, advertised as a successful remedy for pleuro-pneumonia on a farm ; and what I contend is, that there has not been any instance of that disease on the farm where the supposed remedy was successful. It must indeed have been evident to the scientific man that there never had been such a case. Is it reasonable to suppose that a disease which has baffled the accumulated science of the time, and on which no medicine that has been discovered has the slightest influence, would yield to a dose of nitre or nitric ether, which one uses for a common cold ? On the face of things, the notion is altogether absurd.

Now, it seems to me that such mistakes could not have occurred had the connection between the veterinary art and agricultural practice been thoroughly realised. To what extent that connection should be allowed to subsist, is a question of detail, into which I cannot possibly enter within the limits of a discussion like this.



But, with the view of pointing out its leading features, let me refer to the origin of the animals which we have to deal with—in other words, to the question of breeding. Take one important department of animal existence in the present day—horses. Of cart-horses we have a fair sample. In some parts of the country they are very good; but a very large proportion of them are badly managed. The stables are generally altogether unfit for the residence even of an organised being of a lower denomination; and the treatment which horses meet with is anything but respectable. Still, these animals, by some means or other, have escaped the deterioration which has affected other classes. Take, however, the hack. Where is he? Where, I say, is that animal at the present time? Do you mount a horse once a month, without almost feeling sorry that you have been inveigled into the saddle? It is only by the rarest chance that one meets with an animal that will carry one pleasantly. I do not mean to deny that you may find plenty of animals that will carry you safely to your destination and back again; but, assuming that you desire to have some pleasure in equestrian exercise, how rarely do you find an animal that can ensure it! And is this to be wondered at, when we consider the animal's origin? As Mr Corbet has said, whatever animal a man happens to have, he puts it to anything that turns up. In fact, about as much attention is devoted to this subject as one ordinarily bestows on a sitting of Cochin China fowls, or raising of a litter of puppies. Let us pass on now to the hunter. In this case you may get an animal that is very fast, and will jump remarkably well; but in anything like the old-fashioned run of five-and-forty minutes, how remarkably few animals will you find in at the finish! How much is there sacrificed of good bottom and tone, and length of body and shortness of legs, to the miserable system of breeding a pretty-looking horse, with anything but a long body and anything but short legs! If the animal has a small head and a tolerably thin neck, which he curves in a dignified manner, public taste appears to be quite satisfied. Now this state of things ought not to exist; and with a proper association of veterinary science with agriculture, it could not exist.

Take, again, your stock. I grant that you have done a great deal in that respect. Your shorthorns are a marvel. At every periodical inspection I find them advancing; and we have here, perhaps, the most astounding instance of progressive development which natural history furnishes. It appears from the remarks of M. Girard, who was in his day a scientific man and a close observer of cattle—I am speaking now of French cattle—a good animal had in his day its permanent teeth well up, and its dentition perfected, at the age of five or six years. I constantly find shorthorns with full dentition under three years of age. The attainment of perfect dentition is, I need scarcely say, a proof that the animal has reached the period of maturity. In the case of sheep we have advanced a year, and in that of pigs a year and a half. The pig, which used to require

three years, has now perfect dentition and full bodily development at the age of eighteen months. This shows what can be done when a certain thing becomes advisable, and attention is directed to it. It seems a strong fact in support of Mr Darwin's notion, that you can almost do what you like in such matters. Pigeon fanciers tell us, that they can breed to any particular colour that they wish in the feathers, and what has been done in the case of pigs affords a strong presumption in favour of that theory. But remember that where you have precocity of development, there is a corresponding want of tone in the system. It appears to be an invariable law, that that which is quickly produced shall not long continue. Hence, it is that those animals which you have succeeded in breeding in such wonderful perfection within so short a period are remarkably subject to disease. You will rarely find the lungs of a sheep two years old free from organic malady. Such animals are constantly exhibiting in the internal organisation tape-worms, and hydatids almost without number. Moreover, the problem has yet to be solved, what particular kind of food is best adapted to sustain the animal's body, and to bring it to early maturity without any unnecessary loss of its tone or of nutritive properties. I do not stand here to tell you that a sheep of the age of five years would be much better food for the people than a sheep of the age of one year. I should consider that I was rather trespassing on your patience if I did more than allude to what is so palpable.

But the question is, not which animal is best for the market, but which will pay best, commercially speaking. It would be altogether unreasonable and absurd to expect the farmer to keep his sheep up to the age of four years, merely that people might have better mutton. Of course, one would always prefer four-year to one-year old mutton ; but one is tolerably contented so long as the mutton supplied is in a healthy condition. It is admitted, that the presence of sheep on the farm is a necessity of English agriculture ; in fact, our system of wheat-growing, in connection with turnip husbandry, is dependent on that animal. But the question for the agriculturist to decide, is how long the animal may be most profitably kept. My own opinion is, that, as they are at present bred and fed, if the growing flocks of the country were retained two years instead of one, the loss to the farmer would be irremediable, and the percentage of deaths terrific. Knowing what I do about the condition of such animals about the age of one year, which may be regarded as the term of tolerable maturity and general development of the bodily system, I hold that with the same method of feeding—I mean feeding largely upon roots containing an enormous percentage of water, and tending to produce a flabby and loose condition of body—the animals would suffer seriously if they were kept much longer.

While the present system of feeding exists, no remedy for the evils which accompany it can be suggested. But against the system of fattening animals I wish to enter my strongest protest. The ob-



ject of agricultural exhibitions should be to encourage the development of the most perfect forms of animals, not to create a large amount of fat; and the animals which I see from year to year are far from satisfying me in this respect. I observe more and more fat laid on, apparently for the purpose of concealing defects; and I regret to be obliged to say of the judges, some of whom probably are present this evening, that they are in some degree responsible for this. I do not know whether it is really the case that they judge favourably according to the amount of fat upon an animal's body, but I do know that breeders generally are under the impression that they do so. Breeders say, "It is no use sending that animal to the Agricultural Show; it is not fat enough for that purpose!" That is language which ought not to come from the mouth of any breeder in the kingdom. In examining the internal organisation of animals which have died, I have found, in many cases, fatty disease of the liver—a disease which it might well be supposed was confined to men who loved to gratify their taste for turtle-soup, and other things containing a large quantity of oleaginous matter. I have found this disease not only among stock, but even among horses and cats. It exists, I believe, at the present time among horses, cattle, sheep, and calves, to an enormous extent; and the presence of such a disease as fatty liver proves that there is something essentially wrong in the present system of feeding, and suggests the importance of proceeding on regular scientific principles, which, though they may be imperfect, are nevertheless, as far as they may go, tolerably well defined.

Well, then, having to consider the stock on the farm as subject to disease, one of course naturally regrets being unable to suggest any means by which the veterinary art could materially assist the agriculturist. In the case of the horse one starts with the grand fact, that the carcase of the animal is worth nothing at all, so that it must always be worth while to attend well to his health. His value being, say L.10 when living, he will perhaps only be worth as many shillings when dead; and hence the veterinary art has a much wider field in relation to horses than in relation to cattle. When an animal is affected by epizootic disease, or any disease that is likely materially to reduce the animal's condition, the first question that arises in his mind is, "Will it answer my purpose better to consign this animal at once to the butcher, or to take the chances of a treatment which will probably be successful, with a certain loss of condition?" And I am heretical enough to say, that I think it generally answers his purpose to send the animal to the butcher. [Mr Congreve: "There can be no doubt of it."] I must say conscientiously, that I have never been able in such cases to suggest the propriety of medical treatment, because of that unfortunate circumstance, the certain loss of condition. If you get a valuable hunter back from the veterinary surgeon a mere bag of bones, but with sound wind and limb, you know perfectly well that a certain amount of care

and keep will restore him to his former condition, and the result is that you are satisfied, and the veterinary surgeon obtains the credit of having achieved a good cure. On the other hand, if a fattening ox loses all that he has gained during six months, and it takes six months to bring him to his former condition, the veterinary surgeon gains no credit, and at the same time you are considerably out of pocket; therefore I do not think farmers show any want of a due estimation of the veterinary profession when they decline to submit their animals under such circumstances to medical treatment, or can be blamed for not keeping their animals without such treatment in a condition of disease which necessitates a loss of bulk; but I do blame them for not consulting the veterinary surgeon more frequently than they do, when their animals are threatened with disease. The outbreak of smallpox in Wiltshire during the last summer afforded a splendid illustration of what may be done by combination. The alarm having been sounded, the agriculturists of the district combined, proper precautions were taken, the bodies of the infected sheep were buried, and thus the range of the disease was limited. I shall always point to that as a convincing proof, that agriculturists by associating themselves together with veterinary science, and acting together as one man, may do a very great deal towards the prevention of disease. I cannot add, for it is not my opinion, that veterinary science can do a great deal for animals which actually are diseased.

But here arises a very important question. When the question is, whether it is better to consign an animal that is diseased to the butcher, or to subject it to doubtful medical treatment, I say at once, consign it to the butcher. But there ought to be some restriction as to the condition in which the animal should be so consigned, and it is, I think, for veterinary science to define that condition. There ought to be some kind of certification that the animal was not unfit for human food. It would be perfectly absurd to imagine that all diseased animals are unfit for food. There are plenty of diseased animals that would not repay one for medical treatment, and of which, nevertheless, one would not object to partake. There are plenty of cases of local disease, in which the animal affected may unhesitatingly be consigned to the butcher. But, on the other hand, there ought, I repeat, in all such cases, to be a certificate of fitness for consumption. A large number of animals, which are not fit to be sold as food, are constantly being sent into the market. Some time ago, wishing to obtain some subjects for examination, I sent to a large butcher for them, and I received back five or six animals, which, though in a bad state of rot, were dressed for the market. I have also been told by an individual, that between the town where he resided and London, he had, within the space of six months, killed no less than 750 animals in a state of extreme disease. I believe those animals were all sent to market. Can one doubt this for a moment? What becomes of all these rotten sheep?



We see hundreds and thousands of them alive ; what becomes of them when dead ? To bury them would require whole catacombs ; the real catacombs are the intestinal canals of the human body. We hear of the small-pox, scarlatina, and typhoid fever prevailing among the poor ; and can we wonder at it under such a state of things ?

No one can suppose for a moment that this evil ought to be allowed to continue. As I have before intimated, I think the chief use of the veterinary science is in prevention. How far a regular system of attention to the health of stock can be carried out practically, it is not my province to suggest. I do not know whether or not the system which prevails in China, with regard to the medical profession, would answer in reference to English stock. It is said that in China it is customary for the patient to pay his doctor as long as he is well, and for the doctor to pay the patient when he is ill. Whether that system would answer in this country in reference to the sheep and oxen, I do not pretend to say ; but I am convinced that the re-establishment of the original connection between veterinary science and agriculture would be exceedingly beneficial to farmers. I feel confident that their disconnection has been a great evil ; and I advise you, gentlemen, to endeavour to restore the connection as soon as possible. For this purpose I would remark there can be no question that the commencement of education is the point at which right principles should be instilled. I do all credit to the agriculturists of the day. They present to me a spectacle which is without a parallel—the spectacle of men who, after having laboured for years, and secured the comfort and luxuries of life, in the enjoyment of which they might well be contented to rest, come from their homes to take part in practical and scientific discussions on agriculture, and devote all their efforts to the improvement of a system of which they are able exponents. But while I give full credit to such persons, I contend that there is yet much to be done for the rising generation of farmers. There remains still to be established a sufficient number of schools and colleges for the education of that class of society. After more than a dozen years' experience in relation to agricultural teaching, I believe the system has yet to be discovered which shall meet the requirements of the time. We want more of practice and less of theory. It is a very deliberate conviction that the lecture system is not adapted for compulsory tuition. It is sufficient for those who desire to learn, but not for those who do not ; and among the rising generation of farmers are to be found a large proportion of those who do not feel the necessity of learning. I believe that the only system of instruction which is likely to prove effectual is that which is carried out in some of the medical schools in London—I mean the system under which a young man is required not merely to learn a thing, but to do it. We want more schools and colleges in connection with agriculture. That there should be only one agri-

cultural college is, I think, a reflection on the whole kingdom. There should be a dozen colleges, altogether disconnected with ordinary school teaching. You cannot in one part of the day treat pupils as men and in the other part as school-boys; the ordinary education should be firmly fixed before youths are sent to an agricultural college, and when they are there, their attention should be directed to the science and practice of farming. I have often been struck with the enormous extent of information collected in practical classes compared with that which has been obtained in the lecture-room. Let me add, that there can be no question that by the institution of schools and colleges, by the establishment and extension of such clubs as this, by occasional lectures, by the inspection of stock in different parts of the country, and by a general combination of interests, you will best solve the question how we may draw closer the relation between the veterinary art and agriculture. The two things were, as I have before said, originally connected, the one arising naturally out of the other, and their disconnection must be injurious alike to both.

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*Disease in Town Dairies, and its Prevention.\** By JOHN GAMGEE,  
Principal of the New Veterinary College, Edinburgh.

GENTLEMEN,—The subject on which I have the honour to address you this evening—the prevention of disease in town dairies—is one of great importance, not only to the people in large cities, but to the country generally. If I have travelled 400 miles to address this audience, it has been because this vast metropolis is the pulsating heart of the British dominions, pumping forth pure or vitiated blood according to the state of health in which it is preserved. We have here the accumulation of disease, the importation of foreign plagues, and the communication of these over the whole land. Twenty years ago we first knew what it was to see the much and justly abused cow-sheds swept clean of their inmates by the lung-disease, just as smallpox and scarlatina depopulate the human habitations they invade. Every one was taken by surprise, and the new disease which first destroyed eighty or ninety per cent. of the animals amongst which it broke out, has continued up to this time to kill twenty, thirty, and upwards of fifty per cent. per annum, without leading to the adoption of proper preventive measures; disgracing the professional men who have attempted to cure it, and ruining the wealthy stock-owners who, prior to 1842, were worth many thousand pounds, and owned many hundred cows as their stock in trade.

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\* A Public Lecture delivered at the Marylebone Institution, on Thursday, Oct. 22, 1863—E. Holland, Esq., M.P., in the Chair.



CONDITION OF TOWN COW-SHEDS, AND OTHER PRESUMED CAUSES OF  
DISEASE AMONGST COWS.

The universal outcry was against the cow-sheds, denouncing the dirt, the bad ventilation, improper food, and choked-up drains. Many years elapsed before it was perceived that the plague was no less destructive in the fields of our best cattle-rearing counties, or on the hills on which it might accidentally be carried. Some have asserted that cold induced the pulmonary complaint, but how can they explain that the mortality is always twice as great in July as it is in January? Others have blamed exposure, but our housed stock, cattle in warm climates and in the most sheltered situations, enjoy no immunity. Some accuse east winds, others the south-westerns, and not a few the absence of all wind, as calculated to breed the lung-disease. The fact is, there has been a deep and enduring ignorance on the subject, which we owe to the want of combination for the investigation and prevention of epizootic diseases, and to the failure of individual veterinary practitioners, who have unwittingly favoured the growth of that universal system of slaughtering the affected animals for human food.

Thanks to the Medical Officers of Health, the London cow-sheds are at present, in numerous instances, models of cleanliness, and good management. If we compare many of the London cowhouses with farm-yards in general, we shall find the comparison entirely in favour of the metropolitan sheds, and, strange to say, the exclusion of the cows from the public parks has operated beneficially on the health of cows. I have noticed very serious mortality in cities where the cows were regularly turned on commons or on parks, and I can instance in support of this both Newcastle and Dublin. I remember when it was generally the practice here to turn the cows out in summer, and invariably with bad effect. A cow yielding milk thrives best when she is left quiet, and at an equable temperature. To run the animals about, to travel them on roads, and turn them into fields where cattle of all kinds are permitted to graze, only tend to favour the spread of contagious diseases, and to diminish the amount of produce derived from the cows so treated.

## STATEMENT OF FACTS RELATING TO THE DAIRIES OF LARGE TOWNS.

Experience teaches us, *firstly*, That cow-sheds are indispensable just as much as stables for horses are indispensable in large cities. The country supply of milk may greatly limit the number of cows kept in densely-peopled districts, but the wants of the community necessitate having some cows near to the people who consume the milk. Railways have not altogether annihilated space; there are moderate-sized towns where all the cow-sheds might be beyond the police bounds, but in London and other large cities this cannot be attained.

*Secondly*, That the contagious diseases which have destroyed

town dairy stock to so great an extent during the last twenty years, spread independently of any local cause which might happen to militate against the health of animals. All the whitewashing, ventilation, flushing channels, and cleaning out manure heaps, so properly insisted on by medical officers of health, have tended to abate the nuisances which cow-sheds proved to be to their neighbourhoods, but they have in no way checked the mortality amongst cows by contagious disease.

*Thirdly*, Prior to the importation of foreign stock and foreign diseases our town cows lived many months, and even two or three years, in the execrable sheds so often noticed with disgust and discontent, or with perhaps too much romance. It was no uncommon system to breed from the town dairy cow. Now cows have become scarce. They cost more though they are not generally worth more, and instead of living on in tolerable health, they die, or are slaughtered, within six months of entering the town cow-house.

*Fourthly*, On the system at present in force, every dairyman must sell his diseased cow to the butcher, or be ruined; there is no alternative. Some inoculate their cows with success, but others either discountenance the operation, or have it performed by ignorant persons, who destroy as many animals as they successfully operate upon.

Some persons speak of dairymen as if the latter did all they could to keep up disease. Certain it is, that, as a rule, they have not been enabled to keep contagious affections at all in check; but it is most important to know that the losses annually sustained by town cow-feeders have been enormous, and that it is to their immediate interest to reduce losses by disease to the minimum. The sale of diseased cattle to the butcher is a necessary evil, and the first to stop that sale will be the dairymen, if mortality is reduced within reasonable limits. I have no hesitation in saying, that the London dairymen would willingly undertake to bury as much as five per cent. of their stock if they could be guaranteed no further loss; but when a man having a hundred cows must make up his mind to the death of thirty or forty in a year, it is impossible that he should save himself from bankruptcy except by securing the largest amount of salvage which the diseased-meat market will afford him. Inspect and coerce as you like, these diseased animals will be sold; and notwithstanding this sale, the dairymen are heavy losers. Many of them lose three and four hundred pounds in a single year; and had they not the opportunity of selling to the butchers, they would lose double and treble that amount during a similar period. In a report prepared by me for the Lords of Her Majesty's Council, I show that eighty-eight dairymen in Edinburgh lose upwards of L.10,000 annually; that nine dairymen in Dublin lost on an average of twenty years L.1158 per annum; and on the 12,000 cows kept in London and its suburbs, there is an annual loss of at least L.80,000. Show the town dairymen a way out of their present great difficulties, and



they will be only too glad to save these enormous sums of money. We must, however, reason and bear with them, rather than abuse and unreasonably torment them.

*Fifthly*, The prevalence of disease amongst cows necessitates the use of diseased milk, or of milk largely diluted with water. Of the diseased milk much is directly injurious to human beings, and especially to infants. This has been observed in all countries and at all times when the foot and mouth disease has prevailed. I have on former occasions drawn special attention to this subject, and Dr Druit witnessed the aphthous disease in two children last year fed on the milk of a diseased cow. If the malady has been rarely recognised in this city, it has been owing to its similarity to other eruptive affections of the mouth and skin, and the difficulties attending the tracing of disease to the use of the milk of diseased animals. An attempt has been made in the North to lead the public to believe that diseased cows will not yield milk. If they did not, how often would the supply have been totally stopped from many dairies! It is well known that milk is yielded, though in diminished quantities, and not much during the stages of intense febrile excitement. Only on Monday last, in company with a medical friend, I saw two diseased cows milked in the cattle market, before passing into the hands of the butcher who was to kill them.

#### NECESSITY FOR A CHANGE IN THE EXISTING SYSTEM.

My object this evening is to recommend a change in the management of town dairy cows, with a view to the prevention of disease; a change which must soon meet with the hearty approval of the dairymen themselves, and which is sure, in the course of a little time, to lead to a very material improvement in the health of cattle throughout the length and breadth of the United Kingdom.

The system I advocate aims at reforms rather than revolutions, at judicious modifications of the present practice rather than wholesale metamorphosis. It includes several points of great importance, which must be referred to separately, and on which it is essential there should be a clear understanding.

I have repeatedly stated, that I would undertake to maintain in perfect health, in the centre of any of our large cities, as large a dairy as any at present in existence in the United Kingdom. I would accomplish this by buying cows only in districts free at the time from contagious diseases; sending the cows in horse-vans or other clean trucks to the dairy, where there should be a perfect arrangement for the separation of the regular standing stock from the newly bought animals. I have known several instances in which these measures have been eminently successful in this country and abroad, and in illustration I may notice the excellent experimental or model dairies in connection with the veterinary colleges of Turin and of Berlin.

What I have to deal with, however, on the present occasion, is not what I should do if I were a cowfeeder, so much as what shall we do with the mass of dairies, where disease is or has been raging; and with the multitude of dairymen who cannot be expected to travel the country in search of cows to buy, and who have not the convenience which a rational quarantine system requires?

#### PROPOSED PLAN.

The plan which I have to recommend now is one which will secure a necessary co-operation between the cowfeeder and the veterinarian, and which will place the latter in the advantageous position of preventing rather than attempting to cure the lung-disease.

I propose that we should organise a system of veterinary supervision, apportioning a certain number of cows to each professional man, whose duty shall be entirely and unceasingly to attend to the health of the stock thus entrusted to him. The system is one which has extirpated glanders from our cavalry barracks; and what more incurable or contagious affection can exist than glanders? In the army the veterinary surgeon does not attempt to cure incurable disease, as professional men have done in town dairies, but no sooner is there evidence of the disease appearing, than it is cut short by separation and slaughter of the sick, and the use of disinfectants.

The first effect of organising such a system would be to show us distinctly to what extent and where disease is raging, and whence it was transmitted to dairies. Cowfeeders would then learn how to combine with a view to keep our markets clear of diseased animals; to devise a plan for the conveyance of stock by rail without rendering it diseased; and they would soon ascertain where they must go for healthy animals, which, so long as they are in the breeders' hands, are free from contagious affections.

#### EFFORT TO SUPPLY HEALTHY COWS FOR TOWNS.

I believe that without much difficulty dairymen could devise a system for the supply of healthy stock from the breeding districts of this and other countries. A depôt within easy distance from London could be easily kept up, and this would keep the animals from the public markets in which they catch disease nine times out of ten. This system would be very unpopular with the dealers, but the dairymen are entitled to adopt every means whereby they can get a supply of healthy cows.

It is now demonstrated, that the contagious pleuro-pneumonia can be prevented in more ways than one, and most certainly by the practice of inoculation. The mass of evidence on this point is so great, that it is impossible to allude to more than a few leading facts. I have carefully read all that has been published on the subject in Germany, France, Holland, Belgium, Italy, and this country. I have



met in my travels, and during the recent congress of veterinary surgeons at Hamburg, the ablest veterinarians in Europe, who have demonstrated the efficacy of inoculation ; and I have inquired into the success of cattle-insurance companies which have adopted this system of protection from loss by the lung-disease, and the evidence thus collected irresistably compels me to admit, that we calculate with absolute certainty to reduce losses of 40 and 50 per cent. to 5 and 6.

At present the cowfeeder drives to the public market and mixes with healthy stock the diseased cow which he has for sale ; if he attempts to dispose of her at home he gets little money ; if he sells her in the public market he gets the market price. This is not all. Whatever stage the diseased animal may be in she is sold, and this notwithstanding that drugs may have been poured over her throat in large and even poisonous quantities. I admit that it is rare to drug the animals at all ; but a certain percentage receive drastic purgatives and poisonous sedatives, which have often killed to my own knowledge ; yet this has not prevented the sale of the diseased animals to the butcher.

#### LEGALIZING AND CONTROLLING THE SALE OF CERTAIN DISEASED ANIMALS.

With a view to the prevention of disease, and therefore ultimately to the complete abolition of the traffic in diseased cows, I propose, that on a veterinary surgeon's certificate, the cows which show the first, or premonitory signs of disease, should be sold—such animals should never be allowed to remain a day in the dairies, as they there yield bad milk, and communicate disease. Let them be at once removed, and instead of permitting them to travel upon roads, at a trifling cost a van could be had to carry them to their destination. Moreover, they should not be allowed to stand in the public market ; and why not then apportion to them a nook or special lair, in which they can be seen, bought, and transferred to a near slaughter-house to be killed. I am here alluding to cows seized with the lung-disease, which in the very earliest stage can be eaten with tolerable impunity. The system of sale which I recommend has been adopted everywhere on the Continent, where efforts have been made to stop the disease, and these efforts have been crowned with success.

Instead of allowing the sale to go on by stealth, as it must surely continue to go on, let us have an eye on the diseased animals from first to last. During the first month or two that such a system is in force, the number of animals slaughtered as they first show signs of ailment would be considerable, but the effect would be speedily to diminish that number.

What I am anxious to secure is a hearty co-operation between dairymen and professional men for the prevention of disease. At present they respectively engage in trials of strength, and the dairymen exult in their victories, when they see that the irresistible force of circumstances has enabled them to win a point against the sanitary

reformer. I have therefore to ask the Medical Officers of Health maturely to consider the effect of thus legalizing and controlling the traffic in diseased animals, and securing the co-operation of the market authorities. I regret to say that, at every visit I have paid to the Islington Cattle Market, many diseased cows have been disposed of amongst healthy animals. Recognise the importance of segregating these animals, and permit this to be done without inflicting penalties on the dairymen, and you will soon see the number diminish.

I am aware that some will regard this measure, notwithstanding that it is imperiously called for by the necessities of the present *regime*, with distrust. They would rather hear of the extermination of infected animals—a system which it has been said I have advocated, but which I have been steadily opposed to. It is the lot of every public man to be misquoted and misrepresented, and I have occasionally suffered, though I look back with satisfaction and gratitude to the very hearty support which I have received from the Press throughout the length and breadth of the land.

I have, on former occasions, insisted on the importance of having infirmaries for sick animals, to which they might be removed, and I have advocated a system of buying up the diseased cows. Such a system would answer and pay, but the difficulties to be encountered are too great, and the diseased-meat butcher is too keen a competitor to be readily opposed by such a means. I still hope to see the day when, with the diminution of disease in town dairies, we may devise a profitable system for treating the sick in central depots, but the task is too gigantic to be hastily undertaken, and it is, I think, preferable to permit the disposal of animals at such a stage of disease as not much to interfere with the wholesomeness of their flesh. This sale, however, should only be permitted where preventive measures are carried out; and one reason for urging this is, that farmers and cowfeeders go on selling animal after animal, trusting that the disease may cease, whereas it continues. If pleuropneumonia appears in a stable, the first animal sent off should lead to the adoption of proper preventive measures, and instead, then, of selling fifty or sixty diseased animals out of a dairy, only one or two would have to be disposed of.

#### IMPORTANCE OF EARLY SEPARATION OF DISEASED FROM HEALTHY ANIMALS, AND OF THE USE OF TONICS.

What is to be done next? The veterinary surgeon must decide. In some cases it may be necessary to inoculate; in others, a few days' tonic treatment to the still healthy animals may ward off the disease. It is very remarkable how variable the progress of the complaint is; and how accurately the course it will take, may be determined by circumstances which the professional man has it in his power to weigh. It is only amongst dairy stock that I find inoculation essential. Grazing and feeding stock can be well protected



by early separation of the diseased animals and the administration of sulphate of iron to the remaining stock. Much depends on the prompt separation, and it is for this reason that I want veterinary surgeons regularly to auscultate cows, so as to separate them, even before the dairyman would challenge them to be diseased. I have often diagnosed cases a week or a fortnight before any one would notice any sign of ill health. A few days since I received a letter from a farmer, from amongst whose stock I picked out four apparently healthy animals. They were sent to a butcher, who did not believe them to be sick. He turned them out to grass, and, within a month, three out of the four had to be slaughtered, and their lungs were then found to be enormously enlarged. The farmer reports that this prompt separation saved his stock, as he had not had another case of lung-disease, though it is now several months since I visited his farm.

#### VALUE OF INOCULATION.

The Veterinary Inspectors which I wish to be employed by the cowfeeders should, when necessary, inoculate. On this subject I have to say a few words. Indoctrinated as I at first was to regard inoculation as positively injurious, it took several years to shake off my prejudices against the operation. I still regard it as best avoided when possible ; but I know from experience that it can be resorted to with great benefit and with little danger. I am quite convinced, that if we are to undertake that most important task of clearing town dairies of pleuro-pneumonia, we must, to begin with, inoculate many animals. It has been found that this operation is attended with very different results, according to the manner in which it is performed, so that none but professional men should be employed to perform it, that proper attention may be paid to the collection of lymph, and the after treatment of the cow. We recognise in this country, perhaps more than any other, the importance of every man sticking to his own business. Now there are many dairymen paying non-professional men five shillings for the inoculation of each cow, and that often with the worst results. I am quite prepared to find competent professional men at very little above that sum who shall do more than merely inoculate, viz., they will look after the stock thoroughly at all times, and under all circumstances. The practice of inoculation is gaining ground. It is spreading in London as it is elsewhere, and the most intelligent dairymen recognise its value.

#### STATISTICS AS TO INOCULATION.

I may here be permitted to refer to a report published by the Dutch government, and drawn up by J. Van Loon, secretary to the society at Baarderadeel. Extracted from the Gazette of the province of Friesland.

“Does inoculation of cattle, with a view to prevent pleuro-pneumonia, answer its purpose?”

“In this commune (Baarderadeel) there exist three different mutual insurance societies, for the purpose of providing an indemnity to the losers by cattle disease.

“In the first society all animals are inoculated; in the second, all the animals above three years of age are inoculated, with liberty, however, to inoculate the remainder, but with compulsion to inoculate whenever the lung-disease appears in the herd; the third society is opposed to inoculation.

“I have drawn up a state in conformity with this classification; I have collected my facts from the reports addressed by the burgo-master of this commune to the state deputies; and I have completed it by means of information supplied to the Secretary's office, concerning inoculations performed by Jennes and Kielstra. This state extends from the month of May 1856 to April 1857, and comprises the following data:—

“A. Animals which had been inoculated, or reinoculated at least six weeks before the disease made its appearance.

“B. Stables in which the young animals had been inoculated prior to the appearance of disease, the older animals immediately on such appearance, or ten days later, or, lastly, where all the animals were inoculated at the time of the invasion of the disease.

“C. Animals that had not been inoculated:”—

Names of Stockowners.	Names of Places.	Date of the Appearance of the Lung Disease.	Date of the Inoculation.	Number of Animals.	Number Dead or Slaughtered.
A.					
Sytze P. Greydanus	Jorwerd	May 9	1855 and May 14	8	1
Klaas H. de Roos	Weidum	October 24	1855 and Oct. 27	34	5
E. J. Heeg	Britswerd	December 19	May and Dec. 19	48	4
N. J. Swierstra	Beers	December 10	1855 May and Dec.	52	2
Doeke-J. Oostra	Weidum	July 1856, Jan. 15, 1587	1855 and Oct. 1856	35	2
M. D. Wiersma	Bozum	November 17	October 18	37	3
J. A. Alqera	Weidum	November 3	1855 and Nov. 5	27	1
Sjoerd T. Devries	Baard	December 25	October 14	25	2
P. de Boer, J.	Weidum	October 9	1855 and Oct. 9	30	0
Ve. J. T. Visser	Mantqum	October 14	1855 and October	31	0
				327	20=6 p. c.
B.					
Pr. J. Bosma	Bozum	April 5 and October 6	May 15 and Oct. 6	36	4
P. A. Santema	Britswerd	October 9	October 10	25	3
S. T. Bloemhof	Do.	October 15	Oct. 10 and 17	40	6
Ve. B. T. Bakker	Oosterlittens	December 11	May, Oct., Dec. 11	41	6
A. K. Brandenburg	Oosterwierum	October 24	Oct. 20, Nov. 5	21	4
L. Bonnema	Do.	October 20	Oct. 18 and 25	48	2
L. H. Palsma	Oosterlittens	October 18	Oct. 11 and 22	39	4
Ve. M. S. Meinsma	Mantqun	September 22	1855 and Oct. 2	27	4
Ve. P. J. Gosliga	Beers	December 6	Oct. 8, Dec. 16	40	2
W. F. Jellema	Do.	November 16	Oct. 9, Nov. 17	35	4
				352	39=11 p. c.



Names of Stockowners.	Names of Places.	Date of the Appearance of the Lung Disease.	Date of the Inoculation.	Number of Animals.	Number Dead or Slaughtered.
C.					
H. Haatsma	Jorwerd	March 22, August 12	Not Inoculated.	37	15
R. Syperda	Bozum	May 16	Do.	64	33
E. Euga	Schillaard	May 27	Do.	36	20
P. de Jong	Hylaard	September 29	Do.	40	15
J. Jonsma	Winsum	Do.	Do.	37	16
T. Bosna	Hylaard	October 27	Do.	33	12
H. de Groot	Jorwerd	November 6	Do.	35	10
Suierweld	Baard	December 16	Do.	35	9
a. J. T. Boersma	Oosterwierum	December 22	Do.	35	11
D. Bakker	Schillaard	Sept. 6 and Mar. 13, 1857	Do.	37	14
				348	155

The stables here enumerated; are those which under each head were the most severely affected, so that if all the persons of this commune which have animals, were placed in the tables there cited in each section would be the ten most important.

To facilitate, I have added the percentage of loss on the animals insured.

It is needless to add other explanations, except that under the head *A*, I have had to mention two stables, where not a single animal died after inoculation; and if amongst those enumerated under *B*, I had taken the stables where animals had been inoculated two, three, five, and six weeks after the appearance of the disease, I would have arrived at a loss of 20 and 25 per cent.

“I willingly leave to others to decide if this communication replies to the question asked. If I have communicated ‘eloquent’ figures, let others examine them, and from such examination further facts may be drawn out, and a demonstration of favourable results.

“In concluding, I cannot abstain from expressing a wish that all those who have the opportunity should accumulate exact statistics relating to the practice of inoculation, with a view to their publication, that we may know more concerning the worth of this prophylactic.  
(Signed) “J. VAN LOON.”

The society thus started in Friesland by those who had faith in inoculation as a preventive for pleuro-pneumonia, is still thriving, whilst the others have been ruined. This is not to be wondered at, if we study the reports and statistics regarding inoculation in all countries.

Experiments, and the regular practice of inoculation in France, Belgium, and Holland, show that out of 100 animals inoculated where pleuro-pneumonia is raging, rarely more than one dies as the result of the operation, and two take the disease—96 escape healthy.

Out of 3970 animals inoculated in Prussia, 66 only took disease,

and the majority before inoculation could take effect, and only 19 died.

British statistics are scanty, and it is much to be regretted that although Lord Howard de Walden and Seaford supplied the British government with the earliest and most valuable information on the subject in 1852<sup>1</sup>, no extended series of experiments were afterwards conducted here. Professor Simonds, of the Royal Veterinary College, inoculated 122 animals, of which 9 died, 8 lost a portion of milk, and 5 took the disease after having been exposed to the influence of contagion. This led to an unfavourable report, in which a certain amount of preventive influence was accorded to inoculation, but which, it was said, would be obtained by the use of ordinary setons. I believed in the soundness of this conclusion, and was the more firmly convinced of it, that the Belgian commission appointed to experiment on the subject opposed the practice. An able work, by Dr Berglio of Turin, confirmed Professor Simonds' statement; and it was only after several years had elapsed that the many statistics from abroad convinced me that it was proper to perform more experiments here. Owing, however, to dairymen inoculating by themselves, and using putrid materials, as well as cutting deeply in vital parts, I have witnessed various unfavourable results, which we now know how to avoid. I urged on government the performance of some experiments, but without effect. I have urged dairymen to try it, and I find that if we adopt a system of insurance in connection with the use of preventive means, which are now of acknowledged worth, the dairymen will gladly avail themselves of the benefits to be derived by the practice.

The most recent British statistics that I can furnish you with are those of an English veterinarian, Mr Walter Lewis of Crewe, Cheshire.

“DEAR SIR,—With much pleasure I comply with your request to give you some account of my inoculating for the prevention of epizootic pleuro-pneumonia, but I regret to say that, owing to the stocks on which I operated being scattered in this and the adjoining counties of Shropshire and Staffordshire, I am unable to send the statistics as complete as I wish they were.

“My acquaintance with the practice of inoculation commenced on your side the Border, some seven years ago, and resulted, I must confess, in making an impression on my mind unfavourable to the operation. In July 1862, however, I decided on giving it a further trial, and began the experiment on three cows of Mr Whittaker, of Wistaston. No ill effects resulted, and a week afterwards I inoculated the rest of his stock. At that time he had lost seven of his

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<sup>1</sup> See papers respecting pleuro-pneumonia in cattle, and abstract of experiments made by Dr Willems of Hawell. Presented to the House of Commons, December 6, 1852.



most valuable cows from pleuro-pneumonia, and had two or three ill : he has not had a case since. The next experiment I made in August 1862, on Mrs Nixon's stock at Kidsgrove, in Staffordshire. She had lost all her cows but five. I operated on these, and she has not had a case since. I next operated on the stock of Mr Harding, of Audley, in September 1862 ; he had previously lost six or seven cows from the disease, but has had no case since. The next stock I inoculated was Mr Hague's, of Haslington, in October 1862. He had lost one animal, but has not had a case since. The next experiment, and one of the most satisfactory ones in which I have been engaged, was performed in October 1862, on the stock of Mr Walford, of Hadnall, near Shrewsbury. He had previously lost twelve cows, and at the time of the operation the disease was raging with violence in eight others, all of which died. He had not a new case afterwards, until May last (seven months having elapsed), when the disease appeared in some cattle recently purchased in Scotland, two or three of which died. The rest of these I inoculated, and they have since continued healthy. None of those previously operated on became affected. I have since practised the operation with very different degrees of success.

“Up to July 7, 1863, I had inoculated 383 head of cattle. Of this number 9 were ill at the time of operation, and 14 belonged to uninfected stocks : I therefore exclude them from this account. The remaining 360 consisted of 14 infected stocks. In seven of these stocks, embracing 139 head, no new case of the disease occurred after the operation. In another stock of 21 head, one animal fell ill a few weeks after being inoculated, but readily recovered. In two stocks, numbering 27 head, three or four animals fell ill before the ninth day after the operation, and were immediately sold ; and I am not aware of any cases having occurred after the ninth day. With regard to another stock of 42 head, I have heard that no new case of disease appeared after the operation ; but I am not able to vouch for the correctness of the information. I can state, however, that the stock had previously suffered severely from the disease, and shortly afterwards was free from it, and has continued so. In the remaining three stocks, comprising 131 head, inoculation has been attended with but ill success, some 26 cases of pleuro-pneumonia having appeared after the operation, and most of them after the ninth day : of these, I believe, about 5 recovered, 7 died, and 14 were sold alive. Very few were medically treated.

“Of the 383 head inoculated, two animals died in consequence of the operation, and about 20 lost portions of their tails from the same cause. No other ill effects attended it.

“CREWE, 10th Sept. 1863.”

I can supply any gentleman who wishes to inquire into this matter, the statistics hitherto published, and which refer to many

scores of thousands of inoculated cattle, to show that we ought not to delay longer in availing ourselves of a means of preventing pleuro-pneumonia, which is almost universally admitted as quite efficient.

Mr Ward, Her Majesty's Secretary of Legation at the Hague, in a communication dated the 18th of January 1861,<sup>1</sup> says:—"The result of two years' experience of this system in South Holland was that it became well known and generally applied throughout the greatest part of the province; that the apprehension of mischievous consequences from it diminished; that the preventive power of the remedy was admitted, on account of the few instances in which inoculated cattle had been subsequently attacked by the disease; that the disease perceptibly diminished in the communes where inoculation was most generally applied, while it continued to exist where little or nothing was done in the application of these means; that inoculation could safely be resorted to in uninfected stalls without fear of thereby infecting uninoculated cattle; and that the practice of it in infected stalls, while it secured the healthy cattle from infection, checked the development of disease in the infected and apparently still healthy.

"In Friesland the provincial authorities have for some years adopted and encouraged the practice of inoculation, and recommend it as entirely successful as a preventive. The result of the last two years has been as follows:—

Healthy Cattle Inoculated.		Suspected Cattle Inoculated.		Total of Cattle Inoculated.		No. of Inoculated Cattle Dying or Destroyed.	
1858-59.	1859-60.	1858-59.	1859-60.	1858-59.	1859-60.	1858-59.	1859-60.
6382	4478	414	194	6796	4632	190	93

The necessity for professional men being engaged to inoculate, whenever the operation has to be performed, is shown by Surgeon-Major Logie, in last week's *Lancet*, and by the observations of Medical Officers of Health. Surgeon Logie says:—"For months past I have visited several of the dairies in London, and I find that whenever a cow is purchased and brought into a London shed, she is as soon as possible inoculated for the prevention of pleuro-pneumonia. The operation is usually done thus (although there are more refined methods): a slit is made in the cow's tail, a piece of diseased lung, taken from an animal which has died of pleuro-pneumonia, is placed into it, tied up in a rag, and there left. By and by suppuration takes place, and whilst the purulent matter has been oozing from

<sup>1</sup> Reports by Her Majesty's Secretaries of Embassy and Legation.



the wound, I have seen the cow being milked. The suppuration at times is so severe that the tail drops off; at other times the owner is obliged to sell the cow for a mere trifle—for what purpose, I wish I could not guess; and, lastly, at times the animal dies.

“ I shall leave it to microscopists to determine the presence of purulent matter in the milk; but I can say, that carelessness goes on to such an extent in many of these sheds, that the actual matter drops occasionally, by the wagging of the stump, into the pail while the neighbouring cow is being milked.”

#### INOCULATION NOT INDISPENSABLE.

Whilst admitting the worth of inoculation, and recommending the practice, under certain circumstances, I am anxious to impress upon all that it must be regarded, when essential, in the light of a necessary evil. It is not the natural preventive of pleuro-pneumonia, as vaccination is the only and most natural preventive of small-pox in man.

We never shall have a general system of inoculation, and it were very undesirable ever to attempt such a thing, though it is supported by not a few abroad. If we inoculate and disregard all other means to arrest disease, we find that pleuro-pneumonia spreads. There is no better illustration of this than the experience of the Dutch, who, without controlling the traffic in diseased animals, have relied on inoculation, and utterly failed in many parts, such as Friesland, in arresting the progress of the disease. Occasionally we must inoculate, and at other times we can devise other adequate means to prevent pleuro-pneumonia, the most valuable of all being the early separation of the sick from the healthy.

The veterinary surgeons, which I think should be employed to prevent pleuro-pneumonia, could often prevent, or successfully treat, other diseases. Not long ago I entered a London cowshed just after a butcher had cut a cow's throat. This animal had been feeding too heartily, and was suddenly seized with severe indigestion. As the universal rule is to kill and not to cure, the butcher was sent for, whereas a competent professional man would have saved the cow.

The advantages of the plan I propose are great. Both the public and the dairymen must benefit by it. Hitherto there has been much mistrust and deception. London milk is regarded by many as a poison; whereas the cowfeeder, having to contend with disease on the one hand and a suspicious public on the other, has taken great care to conceal his tactics. There should be no occasion for concealment, by stealthily removing the diseased cattle to the market or the slaughterhouse, and the milk trade should be conducted so as to defy rumours, which are often absurdly exaggerated. At present the truth is bad enough; the cowsheds have been cleaned and washed; and yet if we could congregate together the diseased animals sold out of them to the butcher any week of the year, we should see a

herd of 80 or 100 miserable animals in every stage of disease. Sometimes we should see double or treble that number, and we are plainly told that to bury these animals would be to ruin every dairyman in the metropolis.

If a correct register of the cases of disease were kept by the veterinary surgeons employed to prevent disease, we should soon see the real effect of the preventive measures, and the animals whose sale I should sanction would prove few in number, and none but experienced persons could see the premonitory signs which would rather indicate the approach than the existence of any active morbid state.

If dairymen sternly refuse availing themselves of rational means to save the lives of their animals, they deserve to be ruined ; and for the protection of the public, their animals should be registered and carefully inspected. An inspection, without a register in which the disposal of each cow is noted, is simply a farce. I have often been told by ordinary inspectors of nuisances, that there was no disease in dairies, when in reality diseased animals were being sold out of them every week. The inspector walks in during the day, sees the animals in apparent health ; does not, because he cannot, attempt the diagnosis of disease if it should exist, and at once declares all to be right. This is merely a cloak for the existing state of things, and the sooner the mysteries of the dairy-trade are unveiled the better for the cowfeeder and the people.

Medical officers of health have acknowledged that they have been systematically deceived. Thus in the Report of the Trades' Nuisances Committee of the Metropolitan Association of Medical Officers of Health, we find the following startling statement :—“ Under the head of health of cows, the information received is not trustworthy, for the health would appear from the returns to be exceedingly good, and to be equally favourable in establishments of all sizes, whereas there are strong grounds for believing the direct contrary to be the fact ; and indeed in one particular, no doubt the returns are unfair to the larger establishments, for when the health is stated in the answers to be bad or indifferent, this statement is generally founded on the fact of present illness or indisposition in one or more of the cows ; and thus, on this account, establishments with many cows necessarily incurred a greater risk than others of being reckoned unhealthy. The truth is, that cowkeepers generally have, for obvious reasons, been very reserved on this subject, though in some few instances admissions have been made, which are somewhat remarkable :—thus, one proprietor, with seven cows, allows that he has lost ten within the last seven months from lung-disease ; another, with four cows, admits that ten have died of the same complaint within the last three months ; and one, with eight, states that he has lost the enormous number of 230 in the course of twelve years.”

This report was published in 1857, and it must not be imagined



that there has been any improvement. In 1862 I inspected thirteen dairies in the city of London, and in all obtained evidence of a constant high mortality. One individual declared, that in the month of July 1861 he lost twenty cows by the lung-disease within three weeks, out of a stock of thirty animals. The cases are common of dairymen, who usually keep twenty or twenty-five cows, losing thirty and even more in a year. In order to keep a regular milking stock of twenty cows, it is calculated that forty must be purchased during the twelve months. It is the same in all towns. Thus in Dundee last year, one person lost eight cows out of ten by the lung-disease, another lost seven out of eight, and a third twenty-three, though the standing stock never exceeded twenty. The person in whose shed the last loss occurred, assured me that in money she had lost L.200 in six months.

Can we then wonder that we are ill-supplied with milk, and that we are condemned to eat the diseased cows of the dairymen?

It must strike any one, that if cows die off as rapidly as I have stated, the milk trade must be a profitable one. I have explained in my Report to Government, what compensating advantages there are in dairymen being compelled to buy fresh cows at short intervals. As some of the incongruities of the system at present in vogue are cleared up in that Report, I may perhaps be permitted to quote a few words.

In one sense the rapid changes in the dairies are most advantageous to the dairyman. He has a stock constantly on hand, yielding the largest possible amount of milk. For two months after calving, a cow is worth very nearly twice as much as any two months after that period up to the time of her running dry. She will yield a profit of five or six shillings a day, selling her milk, as in Edinburgh, at fourpence a quart. Beyond this period she will not leave more than three or four shillings. It is evident that fifty cows, all within two months after calving, are worth as much to the dairyman as a stock of eighty or ninety cows that have calved from three to six months. No one could suppose the difference between newly calved and old calved cows, if they had no experience in the matter.

In a town dairy an old calved cow does not yield enough to pay her keep; and if she has to be in two or three months whilst the secretion of milk is passing off, and she is laying on flesh for the butcher, it has been estimated that every pound weight of beef thus produced costs the dairyman two and sixpence.

Contagious diseases have taught dairymen, that there is the largest profit in a town-dairy when the stock is not kept too long.

I have known one of the largest dairymen in Edinburgh go to the market and pay L.50 for a pair of fine short-horn cows in good condition. One was sold to the butcher diseased for L.18 six weeks after, and another eight weeks after for L.15. They had given the dairyman a profit of five shillings a head daily whilst they remained

in health,—in the one case a total of L.11, 10s., in the other, a total of L.14; so that altogether the dairyman got from them an amount of L.58, 10s., or a profit of L.8, 10s. on his purchase. Had these two cows lived, they would never have given in the next two months the same profit as two fresh cows in their place. Any man may accumulate capital at such a trade; and it is quite easy to understand what the largest dairyman in Edinburgh said to me a short time since, viz., “that nobody had known how to make money out of cows until the disease came amongst them.”

Some shrewd Edinburgh dairymen have made money more rapidly than their London brethren. They have had less rents to pay, and their diseased stock on the whole has realised more money.

Having thus briefly referred to the diseased condition of the dairy cows, to the necessity for and the advantages of the adoption of preventive measures, I have merely to add, that I am quite ready to assume the responsibility of working as I am of speaking. The organisation of a system to be adopted voluntarily by the dairymen, and encouraged by the Medical Officers of Health, is not a matter of great difficulty. All that we want is a supply of good men. These I undertake to provide: I know where they are to be had; and I guarantee that they will do their duty. I also guarantee that dairymen shall not only have no occasion to complain of breach of confidence, but that every encouragement may be expected by them in the shape of clean bills of health when they can justly claim them, and the publication of these would go far towards encouraging the consumption of London milk and cream.

Let us then cease to cast doubts and unpleasant reflections on each other. Dairymen have been so much accustomed to losses, that they cannot think it a hardship to spend 7s. 6d. on each cow per annum with the prospect of saving ten or twenty times as much. On the other hand, let us protect the man anxious to conduct a pure and honest trade. Let us discountenance sensation articles, which always injure a good cause; and I hope that a year hence I may be in as good a position to vindicate the health of town dairy stock as I have this evening vindicated the cleanliness of a large majority of the London cow-sheds.

In conclusion, I wish it to be distinctly understood that I consider the prevention of contagious disease in large towns as quite essential with a view to the prevention of disease in the country. The farmer is asked to feed more stock; but to enable him to do so, we must put a check on the traffic in diseased animals. We must keep the diseased cows of our cities from our large store-markets; and if we accomplish this, we may hope for some reduction in the price of meat. The cause I have advocated this evening may, in a short sentence, be stated as that of prudent foresight, rational co-operation, and fair dealing, as against underhand practices, reckless waste, and improvidence.



# EDINBURGH VETERINARY REVIEW

AND

## Annals of Comparative Pathology.

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### REQUIRED IMPROVEMENT IN THE BREEDING OF HORSES.

PLAIN evidence is afforded that the question of raising the standard of perfection, and increasing the supply of horses, of various classes, is attracting attention amongst the influential in each of the three divisions of the kingdom.

The Royal Agricultural Society of England has not only increased the amount of its prizes for bringing together the best horses available, but has taken the farther step of offering encouragement for essays bearing on the inquiry generally, without too narrowly defining the incidental parts to be dealt with, by which wise course every man may express his views in his own way, as far as the limits of a paper of ordinary length admit of—the gist of which measure appears to be to elicit free discussion of the whole subject.

In our last Number we reproduced from the Journal of the Royal Agricultural Society, besides the concluding section of Mr Gamgee's Prize Essay "On the Breeding of Hunters and Roadsters," a communication on "Breeding of Horses," by Mr William Dickinson, dedicated to the Right Honourable the Speaker, which will undoubtedly continue to receive the attention it so highly merits.

All who have known Mr Dickinson as long and intimately as we have, will feel assured that whatever he may undertake to write about horses, will well repay the reader for careful perusal. A better judge of the animal, taking all classes of horses into consideration, we do not know; and as a manager of them, Mr Dickinson may be regarded as an authority to follow of the first order. Better proofs, however, of his knowledge of horses, and how to keep them, than can be afforded by words from us, have long since been given by results in his own establishment, rich over a long period in horses considerably varied in description. Without entering into the details of Mr Dickinson's paper on "The Breeding of Horses," we preferred affording our subscribers the opportunity of reading it, as the only way of judging of its worth and profiting by its teaching.

Another essay, "On the Supply of Horses adapted to the Require-

ments of the English Army," by the principal veterinary surgeon, Mr J. Wilkinson, published in the preceding number of the Royal Agricultural Society's Journal, demands reference in this place, whilst we are directing attention to the means best calculated to enhance the standard and augment the supply of horses of the best descriptions.

Mr Wilkinson's contribution, though second in the order noticed, stands first in that of the time of its appearance ; it is also the work of one who has devoted much of a long professional career to his subject, with rare zeal, and under opportunities quite exceptional.

It appears to us that these several papers mutually support each other. Differing, as necessarily they must do, like the past extensive experience of their writers, being the fruits of not the acquired knowledge of one alone, but of different workers, when read, as these papers will be, by liberal men, the effect of widening the range of observation on the available means of producing good horses will, we venture to predict, follow.

Ireland also, so highly gifted for its horse-producing capabilities, has had its representatives of late in the line of inquiry, exposition, and suggestion, to which the afore-named essays are devoted.

Though last to be mentioned, not least, and foremost in the order of time of writing, Dr Carson on "The Form of the Horse, as it lies Open to the Inspection of the Ordinary Observer," must not be passed over.

The work under the above title, which is of conveniently small size, we esteem great in merit ; and when, considering the present state and future requirements of our horse-breeding resources, the reading of those will be incomplete who have not profited by Dr Carson's work. It was first published as a book in 1857, and a second edition appeared in 1862.

Such, however, is the diversity and vastness of the field of inquiry over which the subject of horse-breeding extends, that it will not be in the work of any one, or by the combined suggestions of a few individuals, that the public will find definite rules laid down ; nor, indeed, can many fixed rules be given on the subject, however ardently the work of inquiry may be done. Like all inexact knowledge, the whole subject—comprising an understanding of the horse, how to multiply the greatest number of the species of the highest degree of perfection, and how to preserve them—requires more than mere dogma in order to place the question in an available form, either for reference or tradition.

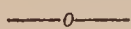
Almost all that men can say well about horses, admits of being



said in a different way with opposite effects. It is not so much the lack of knowledge of horses or on horse-breeding, as the generalisation of that knowledge, that is required ; and perhaps the greatest difficulty by which the subject is surrounded, consists in almost every man claiming the attribute of judge in the matter, whilst on nothing relating to it are men found entirely to agree. Unlike other questions, where the evidence *pro* and *con* can be shown in a more positive way, that applying to horses differs essentially, inasmuch as it is usual to speak of them relatively, every man forming his own fictitious tests on merit of the animal and class of horses. Experience will assume for a long time to come, as it has done for the past, the sway over opinion, empiricism over demonstration ; and that for the reason, that Englishmen will not give up custom with all its admitted faults, for what they are apt to look on as a probable fallacy or a myth. Hence discussion is to be desired, and it is by such means mainly that we as a nation obtain all our reforms. Tolerance and freedom are most desired in the interchange of opinions on horse-breeding.

Men of the highest station may be counted by hundreds, whose knowledge of horses is both extensive and of the right kind ; and our agriculturists possess much experience relating to the subject, which could alone have been gained by succeeding generations of practical workers. Still, on strict inquiry, it will be found that the understanding of each individual on the whole question is limited ; therefore, to bring out every variety of knowledge, by free ventilation of it, should be our aim,—the end, that of mutually helping each other.

There is more sound understanding, on the proper way to breed and manage horses, scattered amongst the agriculturists of a few of the favoured breeding districts of England, than amongst any class of men in any other country ; and it is the turning of that knowledge to the best account that the measures of the Royal Agricultural Society have in contemplation, and which we believe they are well calculated to do, by bringing out some fundamental propositions, and eliciting discussion on them in a free and liberal spirit.

**ROYAL COLLEGE OF VETERINARY SURGEONS.**

A Special Meeting of the Council was held the 11th day of November 1863.

PRESENT :—The President, Professors Spooner and Varnell, Messrs Braby, Gardiner, Harpley, Harrison, Hunt, Jex, Lawson, Moon, Pritchard, Silvester, Robinson, Wilkinson, and the Secretary ; also, S. Garrard, Esq., the legal adviser.—The President in the Chair.

The minutes of the preceding meeting were read, and confirmed.

The Secretary read a letter received from Mr Quain, tendering his resignation as one of the Board of Examiners.

It was moved by Mr Jex, and seconded by Mr Silvester—"That Mr Quain's resignation be accepted."—Carried.

A letter was also read from Mr Field, tendering his resignation as one of the Board of Examiners.

It was moved by Mr Lawson, and seconded by Mr Harrison—"That Mr Field's resignation be accepted."—Carried.

It was moved by Professor Varnell, and seconded by Mr Pritchard—"That Mr Ellis, of the University College Hospital, would be a very desirable and fitting person to fill up the vacancy occasioned by the resignation of Mr Quain.

It was then moved as an amendment by Mr Wilkinson, and seconded by Mr Silvester—"That the election of examiners be postponed until the next meeting of the Council."—Carried.

It was moved by Mr Pritchard, and seconded by Mr Braby—"That a vote of thanks from the Council be awarded to Mr Quain for his valuable and long-continued services as a member of the Board of Examiners, and expressive of their regret at his resignation."—Carried, *nem. con.*

It was also moved by Mr Lawson, and seconded by Mr Silvester—"That a vote of thanks be given to Mr Field for his valuable services as a member of the Board of Examiners."—Carried unanimously.

The Secretary then read a letter received from Mr Garrard, the legal adviser, relative to the cost and expediency of bringing in a bill before the Houses of Parliament, at the next ensuing session. After a considerable discussion—

"It was moved by Mr Wilkinson, and seconded by Mr Pritchard—"That the letter, as now read, be entered upon the minutes."—Carried.

Another letter was then read, and also the report, together with the revised bill, which was submitted to the Council.

In order that the meeting might be furnished with every necessary information relative to the feasibility of the bill being brought into Parliament, it was deemed advisable that Mr Garrard should be present. That gentleman having been introduced to the Council,



gave his opinion relative to the bearings of the aforesaid bill and the charter of incorporation ; also, as to the expenses to be incurred by the bill, and that it might prove prejudicial to the interests and wellbeing of the profession if not passed. In order to give greater satisfaction, if any doubt remained, Mr Garrard begged to propose that the advice of counsel be obtained.

It was moved by Mr Harpley, and seconded by Mr Lawson—"That Mr Garrard be instructed to obtain the opinion of counsel, to be selected by him, as to the probability of the bill being passed through the House, which opinion will be laid before the Council at their next meeting."—Carried.

It was moved by Mr Wilkinson, and seconded by Mr Jex—"That this meeting be adjourned, *sine die*, for the consideration of the counsel's opinion."—Carried.

It was moved by Mr Wilkinson, and seconded by Mr Robinson—"That the examination of candidates for the diploma of the Royal College should take place in the Christmas week."—Carried.

By order of the Council,

WILLIAM HENRY COATES, *Secretary*.

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## PERISCOPE.

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### ON DISEASED ANIMALS.

(Extracted from Professor Gamgee's Report, published with the Fifth Report of the Medical Officer of the Privy Council.)

#### ENZOOTIC DISEASES.

THOUGH contagion plays such an active part in causing the spread of epizootic diseases over the United Kingdom, it cannot be said to exert any influence whatever in favouring the progress of maladies that originate spontaneously in the British Isles. The local influences operating in the production of enzootic disorders are numerous, but there are a few leading ones which deserve special attention being paid to them, from the extraordinary losses they induce.

I shall refer more particularly to food, water, climate, geological formation and soils, systems of culture, and seasons.

#### FOOD.

When the enzootic diseases of Britain are compared with those of other countries, we do not fail to notice that there is a large preponderance in this country of that class of disorders dependent on the abundant supply of rich food.

There is no doubt that the United Kingdom produces more food at present than there is live stock to eat it ; or, in other words, that a far larger number of animals could be annually reared and fattened on the food at present grown for them than there are. My travels indicate, unfortunately, waste in all directions, and that waste is due to two causes. In the first place, a limited amount of stock is kept on more food than is required for it ; and animals fit for the butcher are frequently kept on to convert straw and green food into manure. Indeed, much artificial food is given with a view to improve the manure, and many plans have been resorted to in order to secure a large amount of fertilizing material in the

best possible condition, and these plans have naturally referred to means of housing and feeding cattle which have been considered more for the sake of the manure heap than for the health of live stock. In many parts of Great Britain and Ireland farmers are finding out that grain crops are precarious, and that the feeding of live stock pays best. They find sheep safer than cattle, owing to the latter being destroyed to a great extent by the prevailing epizootics ; and when stock has to be purchased, a far greater risk is run in buying a lot of cattle than a flock of sheep. This leads me to the second point in explanation of the waste of cattle food. When a farmer has purchased a certain amount of stock, and pleuro-pneumonia appears, he experiences great difficulty in eating down his crops, the surviving animals get an excess, and perhaps a lot of turnips are ploughed into the soil as manure without having been touched.

We are not producing young stock enough to consume the food annually grown, and the comparatively scanty amount of stock we have is rapidly reduced by disease—by disease which I have already shown is in great part foreign to our land ; but in proportion as the foreign diseases kill our stock, there is a surplus of food to favour the production of the most fatal of our enzootic disorders.

At a recent meeting of the Central Farmers' Club a very interesting paper was read on the advantages of rearing stock in preference to corn in this country, and various reports were read from different counties. The burden of speeches and reports were to the effect that far more stock could be reared and fed in the United Kingdom than has been done for the past. Farmers have purchased foreign cattle and sheep to graze, owing to the lack of British stock, but our foreign imports have not increased, and our home production has been extremely deficient.

The amount of food varies according to seasons, and we find that the worst period for many enzootic disorders is the spring, when the animals are changed from bare winter keep to luxuriant pastures.

The quality of food must be taken into consideration. There are many districts where enzootic disorders prevail, owing to the richness of the food. More facts are needed on this subject ; but it is quite evident in practice that splenic apoplexy, parturition fevers, and blood diseases, prevail in all animals on farms and in districts where the soils are rich and the farmers liberal in the supply of manure to the land, and even artificial food for stock. Since the introduction of turnip husbandry in this country, blood diseases, due to luxuriant crops of these roots, have made their appearance, and annually destroy cattle and sheep in great numbers.

The introduction of artificial food has had a beneficial influence on the health of stock, especially in affording farmers an opportunity to keep up the condition of their young animals in winter, and thus avoid the sudden and dangerous transition from poor to rich keep above alluded to. The best of these artificial foods is the one which has occasionally led to severe outbreaks of diseases incidental to plethora—I mean oil-cake. Cases occur not unfrequently of animals fed on oil-cake dying off rapidly, and the cake is suspected to contain poison. Analysis, however, reveals that it is extremely rich, and the farmer has sustained the loss owing to a too liberal supply. Oil-cake given in moderation to young cattle is, perhaps, the best preventative we have for anthrax ; but it will not answer the farmer's purpose to allow such rich food to animals *ad libitum*. I have often noticed the waste on farms from food of all kinds being thrown before stock without care being exercised in apportioning the proper quantity to each animal. Thus, I have known cake broken up for a lot of cattle and thrown into boxes in an open yard, and on weighing the cake, have found as much as 14 or 15 pounds weight for each ox. I need scarcely say that the animals might greedily swallow the greater part of this food, but the waste would be enormous, and the health of the stock suffer.

Food induces enzootic disorders from peculiarities in its composition. There is no doubt that the plants growing in fields adjoining or in the midst of woods are not too rich or too poor in nutritive elements when they induce enzootic dysentery. They contain deleterious principles. Animals thrive best on food charged with considerable moisture ; and it is to the solid and dry condition of the plants on



many hill pastures that we must attribute blood diseases. There is a wide field for investigators in this branch of study.

Enzootic disorders abound in districts where roots and grains are grown on ill-drained lands. Anæmia, asthenic hæmaturia, and rot, are all due to this cause. Turnips grown in the same soil induce no disease if reared on fields that are drained, whereas on adjoining fields, where the land is wet, they acquire properties which render them unwholesome food for cows and other animals.

#### WATER.

If food is a very prolific cause of enzootic diseases, either from its abundance or scarcity, its richness or poverty, the excess of certain elements or lack of others, it is not less the case with water.

It has been supposed that the filthy water which animals are constantly allowed to drink is a prolific source of disease ; but there is not much evidence to prove that animals do suffer, unless the water becomes charged with a poison, such as lead, or contains an excess of lime, as in some districts, where urinary calculi are very destructive amongst sheep, as on the Cotswold hills.

Very interesting observations on the constitutions of water in inducing disease were recently made by Professor Voelcker, who was deputed to analyze the water in a district where splenic apoplexy was raging. Professor Voelcker reported that "he had analyzed four different kinds of water, and one contained no less than 235 grains of solid matter to the imperial gallon. This solid matter was composed of various medicinal salts, which must necessarily affect the whole constitution of animals ; and he did not feel in the least surprised that animals supplied with such water had become subject to serious disease. It was clear-looking water, but was, nevertheless, very foul indeed. Among other things, it contained nitric acid, as much as one grain to the imperial gallon ; and 19 grains of organic matter, showing that somehow or other, refuse materials accumulated on the surface of the soil underwent regular nitrification, and found their way, in a more or less completely organised state, into the whole of pump water. Then, again, there was a large proportion of sulphate of soda, sulphate of lime, sulphate of magnesia, and some sulphate of potash. These were salts, which in their combinations had a medicinal effect very much greater than that which they produced separately. It was a well-known fact that in certain districts of Somersetshire, where tart or scouring lands prevailed, medicinal effects frequently occurred. On referring to the composition of some water in a district near Bridgewater, he found that it contained less solid matter, namely, 202 grains to the imperial gallon. The water on Mr Bradley's farm being examined, contained 235 grains ; it was unquestionably mineral water, a single tumbler full of it taken in the morning being sufficient to produce a decided medicinal effect. There could be no question then, that in a Lias district there were materials having a tendency to produce disease, whether it were splenic apoplexy, scouring, or some other disease, he could not say, but that such water could not be drunk with impunity was certain. There was other water which was evidently impregnated with the drainage of the farm-yard. It must be undesirable that animals should drink such water, as impurities were injurious ; but nevertheless he must remark that all ditch water, and water apparently foul, proved on analysis to be the purest description of water. On analysis it was found to contain only 26 grains of solid matter to the imperial gallon, and in the solid matter there were only four and a half grains of organic constituents."

#### CLIMATE.

There is a great difference in the diseases of different climates, and the same disease is modified by temperature, winds, moisture of the atmosphere, &c. I need not enter into many particulars on this subject, and have only to refer to the remarkable prevalence of rheumatic disorders of animals, and especially of calves

and lambs on high and confined districts ; to the fortunate rarity with which in one cold country the anthrax poison is developed, as contrast with the development of that poison in hotter parts of Europe, and to the very significant fact that no climate in Europe is more favourable for stocks than our own; and in no country can animals be so readily kept from one year's end to another on the fields that may justly be said to be evergreen. In Italy stock must be removed from the hot plains, where the grasses are scorched and withered ; and in Germany sheep and cattle must be huddled together in stables in winter, and fed on hay and other available food. Here stock thrives at freedom better than in, perhaps, any other country in the world. To our climate we owe, in a great measure, the extraordinary superiority in the breeds of our animals as contrasted with those of other countries ; and lastly, to our climate we owe the exemption from plagues, which are only seen amongst us as introduced by diseased foreign stock.

#### GEOLOGICAL FORMATIONS AND SOILS.

In the present state of knowledge it is difficult to state with certainty that a disease is due to special geological characters in a district where it prevails. The malady that merits special reference under this head is anthrax. There is no doubt that the development of anthrax in different parts of a country like our own depends, to no small extent, on the geological peculiarities of districts. Heusinger has said that it occurs on the granitic and chalk Alps, on the granite of Lapland and Finland, on the transition chalk of St Petersburg, and on all the Tertiary strata.

In Great Britain and Ireland anthrax is the most fatal of all enzootic disorders, spreading widely over the richest pastures of fertile valleys on the Old or New Red Sandstone formations ; on the soil over the Lias of Somerset and Gloucester, on the crag forms of Norfolk and Suffolk, on the compact soil of the Oxford clay in Oxfordshire, Wilts, and the county of Lincoln. In the counties of Edinburgh and Haddington we find it particularly prevalent, stretching from Dalkeith to the Lammermuir hills ; indeed, in the South of Scotland along the whole tract of Cambrian and Silurian rocks. The hills of Scotland, and the pastures of great fertility intervening between them, teem with cattle and sheep, amongst which there is a heavy mortality from the different forms of anthrax. The black quarter of cattle, which is one of the most characteristic forms of this disease, prevails to a great extent on the old red sandstone of the counties of Ayr, Stirling, Perth, Forfar, and Kincardineshire. It is seen often in the same formation in the eastern portions of Banff, Inverness, and Caithness. It is common also in Kincardine and Aberdeen, prevailing, perhaps, as much on the lower Silurian of the latter county, as on the same formation in Peeblesshire and Berwickshire, and on the igneous rocks of Renfrew and Kinross. Though I have here mentioned most of the formations on which the various forms of anthrax prevail, I must not omit to mention its ready development on the clays of Mid-Lothian, Linlithgow, Lanark, and Renfrew. The soils on the Coal Measures, where not well drained, are also favourable to the development of anthrax in cattle ; and although it may seem puzzling to state where carbuncular diseases do not occur, still it will be found not to occur to any extent on the thin soil of the upper chalk, on the sand soils over the greensand, on the millstone grit, and magnesian limestone. Where the latter formations occur in Durham, Yorkshire, Derbyshire, Staffordshire, and Devon, the diseases, so far as I can ascertain, rarely occur.

In Ireland anthrax prevails in all parts.

In connection with the prevalence of anthrax diseases in the United Kingdom there are two remarkable facts ; 1st, That they are very widely distributed over the land, owing probably to the abundance of clay in its soils ; 2d, This clayey nature of our soils renders them most profitable as pasture lands, owing to the expense attending their cultivation for other purposes ; they require deep drainage, however, to ward off such diseases as anthrax and others, that depend not a little on moisture for their production.



Soils on our highest mountains are deficient in phosphates and other salts of lime, and this is the cause of a singular malady amongst cattle, "*cachexia ossifraga*," or "*fragilitas ossium*." This disease, known by the names of "cripple," "stiffness," and "cramps," &c., prevails under singular circumstances in the mountains of central Europe, and in those of Scotland and England, Wales and Ireland. The loss annually sustained amongst cows thus kept on soil ill-suited for them is very great, and more upon cows than other animals, owing to the amount of phosphates required for the young they bear.

#### SYSTEMS OF CULTURE.

Soils are modified by the farmer in preparing them for the reception of special seeds. Manures are distributed, and according to the nature of these manures do we have the development of enzootic disorders. It is no doubt in a great measure due to the liberal use of artificial manures that plethoric diseases are becoming annually more destructive amongst stock. There are instances in which special diseases are induced by the application of certain manures on land. Thus, nitrate of soda has been known to induce severe forms of diarrhoea. In many parts of Scotland the distribution of police manure<sup>1</sup> leads to the occurrence in many districts of fatal forms of lead poisoning, owing to the refuse lead from painters' shops, &c., such manure contains. Much might be said on the influence of different systems of cultivation in the production of disease, but under the head "Food," "Soils," &c., I have noticed some leading facts as to circumstances inducing disease which depend on the condition of land, and hence on the food grown in it, so that I shall pass from this to say a few words on

#### SEASONS.

Enzootic disorders are most prevalent in spring and autumn. They often attain great fatality in summer, and only a few are most rife in the winter season. It is not, however, the temperature of seasons that alone influence the development of diseases, but in different districts animals are subjected to various influences in different seasons. And we find that amongst sheep fed for the butcher, blood diseases are common when these animals are placed on turnips in November. Amongst ewes similar diseases prevail more towards the spring. Braxy is a disease of winter and not of autumn. The most important fact that I wish to draw attention to under the head "Seasons" in this Report is, that during very hot summers we have reasons to fear the development of blood poisons likely to communicate disease from brutes to human beings.

#### PARASITIC DISEASES.

Parasites travel from place to place and animal to animal in many ways. They are *invariably* generated from pre-existing parents, and no parasitic malady can be attributed to other causes than those which favour the multiplication of animals in accordance with the laws of reproduction. "Rot," in sheep, associated with the development of a sucking worm, occurs where *distoma hæpaticum* meets with favourable opportunities for its migrations. Scab in sheep is found amongst animals that come in contact with diseased ones in markets or on drift-ways. "Measles" in the pig I have shown to occur in the United Kingdom where swine are most likely to eat human excrement and joints of *tænia solium*. "Sturdy," in sheep due to *cœnurus cerebialis*, destroys hundreds of animals where circumstances favour the dissemination and preservation of tapeworm eggs from the dog. The myriads of thread worms which choke our sheep and calves, or make pheasants, fowls, and turkeys, gape, owe their origin to the dissemination of ova. Lambs are fed on a second crop of clover, the first crop of which has

<sup>1</sup> The manure collected in large towns.

been fed off by older sheep, and the result is that they carry into their systems germs left for them by their parents. Human beings suffer from trichinæ which pigs breed for them ; and cases of death in man are not uncommon from hydatids, which are constantly multiplying in the bodies of the lower animals. To ascertain, therefore, the cause of any parasitic disease, we must investigate the laws which govern reproduction in the animal kingdom. The causes which predispose animals to parasitic diseases are all those which tend to weaken, such as filth, foul air, bad food, impure water, and over-crowding or over-stocking.

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## CATTLE DISEASE.

*(From the Times, October 22, 1863.)*

SIR,—The statistics which irrefutably indicate that Ireland is not prospering, include a statement as to the decrease in the amount of live stock. Attention has been repeatedly drawn to this subject, and Lord Carlyle spoke not long ago in Dublin of the importance of attending more to the health of Irish stock, which his Yorkshire tenantry declared to be more subject to the prevailing epizootics than British cattle. Last year I had occasion to study very carefully the subject of disease among animals in Ireland, and arrived at the conclusion that whereas the soil and climate of Ireland are the most favourable in the three kingdoms for the rearing of healthy stock, there is a constant higher mortality there among cattle, sheep, and pigs, than either in England or Scotland. The losses in Britain are enormous, and urgently call for a more careful consideration of the question of prevention of disease among stock ; but we have not so constantly as in Ireland the destruction of our cattle to the extent of 8 and 10 per cent., of our sheep up to 10 and 15, and among pigs up to 10, 12, and sometimes 20 per cent. How is it possible in the face of such losses that an essentially stock-producing country should thrive ?

Of late years the difficulties have been enormous in the way of getting calves in Ireland for the purpose of rearing and fattening. They have been bought up in Lancashire, Yorkshire, and adjacent counties, where, born in the cow-sheds of large cities, they have contracted diseases which they have transmitted down the Irish Channel, and losses on them have been sustained amounting very frequently to 50 and 60 per cent. I was most careful in tracing the spread of contagious diseases ; and the best informed persons in Dublin, several of whom were engaged in the trade of calves, assured me that, owing to losses by disease, there had been a great demand for English calves, and these had constantly carried over to Ireland the diseases which, in Britain, are due to the importation of foreign stock and to the ever-increasing traffic in diseased animals. Many of your readers will doubtless remember how the Earl of Cork visited his tenantry last year and granted reductions in rent in consequence of the heavy losses by disease. Mr Herbert, of Muckcross, assured me that the demands on Irish landlords were great and universal from this same cause.

Among sheep and pigs the losses by disease were very heavy last year. Indeed, the rot has destroyed thousands of sheep annually ; and during 1862 the parasitic lung-disease appeared with great virulence. The pigs have been carried off in late years by the so-called hog cholera, and the measles have continued to reduce the value of a very heavy percentage, though not so great as formerly.

It is a very easy task to calculate losses to the amount of many hundred thousand pounds sterling per annum even in a poor country like Ireland, and all this by preventible disease among stock. Surely the subject should be inquired into, and unremittingly worked out. It is important to remember that when animals are destroyed by disease, there is not only the direct loss on their money value, but they are carried off the land which they should fatten. When we consider how land improves by feeding sheep on it, we can easily understand that last year Irish farmers lost enormous sums of money from the sheep dying off as they did.



The losses cannot be calculated, as they are not confined to the single year. Land which is imperfectly manured one year requires more another, and to obtain this money must be spent.

If the difficulties in the way of prevention of disease were insuperable, and if attention to the subject necessitated enormous expenditure, there might be some excuse for the absence of all effort in that direction ; but as the immediate return for any trouble or expenditure would very large, and ever increasing, it is truly surprising that some steps are not taken by Government with a view somewhat to check the ravages by cattle, sheep, and swine plagues—of home and of foreign origin—in a country so poor as Ireland. If attention be paid to the health of stock Mr Donnelly's returns will soon change their aspect. If, on the other hand, we continue as for the past, Ireland's decline can only be accelerated.—I am, Sir, your obedient servant,

JOHN GAMGEE,

Principal of the New Veterinary College,  
Edinburgh.

London, Oct. 23,

## LOSSES AMONG CATTLE.

(*From The Times of November 10, 1863.*)

SIR,—The letter which appears this day in your columns, showing the great advantages of conveying foreign cattle to London *via* Harwich, induces me to ask what additional precautions are being taken to prevent the introduction of diseased animals from abroad, seeing that there is a prospect of the “ largest portion of the cattle trade from the north of Europe ” never coming under the notice of the inspectors of the port of London. A full cargo of bullocks, calves, and sheep, is said to have been landed at Harwich at 12 o'clock on Sunday night, and they were in the metropolitan market by 10 o'clock on Monday morning. Now, unless I am very much mistaken as to the time required to truck and convey the cattle from Harwich to London, the landing, watering, feeding, and inspecting of the full cargo must have taken place before 6 o'clock on the Monday morning—that is to say, when dark ; and if this be the usual practice, I know not what is to prevent a destruction of British live stock to an extent even exceeding the frightful proportions already attained.

I do not seize my pen to write without weighing the effect of restrictions on trade ; but, sir, I am receiving letters by every post from all parts of the United Kingdom complaining of the condition of the lean stock, for which fabulous prices are being paid, and which is at the present time distributing diseases in all directions. As yet there is not a farm I have visited in England or in Scotland on which cattle from the great Falkirk Trysts, and many country fairs, have been taken within the last two months without suffering from the foot-and-mouth disease. On not a few of the farms the lung-disease has already appeared, and in many more it must shortly manifest itself with its usual virulence. I have seen not a few lots of cattle bought at L.12, L.13, and L.14 a-head, which, three weeks or a month after purchase, have been reduced in value at least L.1 per head. When we consider that these animals are to be fattened by next spring, the loss of so much time is a very serious matter ; and knowing how universally this loss is sustained, I venture to suggest that we should not overlook the fact, but do all in our power to study how we can encourage trade and protect our cattle from deterioration and destruction. The price of meat is high, and still higher must it go. There is no alternative. Our foreign importations have led to a steady rise in price for years past, and must still favour that rise if we do not check their plague-disseminating tendencies. Are our farmers likely to get the full benefit of high prices ? When I look at the reports of markets in your columns I see that, after all, those engaged in the fattening of stock in this

country cannot make much money after paying as they do for store-cattle, and incurring the losses which, at the present day, almost inevitably attend the purchase of stock. Many stockowners have written me of late on this subject, and there is no doubt that they are getting fully alive to the important question of preserving the health of their cattle, and they ask me, how is this to be accomplished?

I hold that the abundant supply of wholesome animal food at a moderate price is so important a question to the people of this country, that there should be inquiries constantly going on as to the condition of our live-stock traffic, and as to the influence exerted by that traffic on the production and distribution of disease. The extraordinary prevalence of the foot-and-mouth complaint at the present time, which exceeds the formerly unexampled frequency of the malady twelve months since, depends entirely on the condition of foreign stock. This is at the root of the evil. We could not have the disease without its introduction. We never had it before free trade in live stock, and we have it not at present where cattle are only sold and exported from breeding districts. It is perfectly true that many Scotch, Irish, or English cattle leaving their original homes in perfect health prove diseased in the fairs and in the farms they are taken to—but why? The answer to this question has been frequently given this year by practical men who have spoken at various meetings when the subject of cattle disease has been discussed. They unanimously say, “Look at the cattle trucks? They are never cleaned out from year’s end to year’s end, and after conveying one lot of diseased cattle, the mass of filth bespattered on the sides, and lying thick at the bottom of the trucks, is charged with poison which readily infects any animals coming in contact with it.

Foreign stock brought into this country diseased, or simply infected, would not injure British animals, if we learned how to keep it by itself. Our farmers, as a rule, refuse to buy the foreign animals for store purposes, and the great majority of them is sold at once to be slaughtered. This being the fact, and as inspectors never can altogether prevent the admission of infected herds into this country, why do we not dispose of our foreign stock in special markets or in special divisions of the present market, where practicable, and have proper accommodation for their slaughter, or proper means for conveyance beyond the markets, without coming in contact with British stock? Of course, those interested in the foreign trade will pooh-pooh all this; but we cannot allow these gentlemen to continue, as they have done, defying interference and destroying the produce of these islands. Twenty years’ experience should open our eyes; and what does it teach us? It clearly demonstrates, that had we never imported foreign cattle we should now be paying less for meat than we are doing. Our breeders, graziers, cattle-dealers, and others, would never have known what it was to lose as they do at present. The production of live stock would have kept better pace with demand, and our people would be better fed. I quite admit, that if our importations had been conducted on a system such as would have prevented the spread of contagious disorders, they would have done us almost as much good as as they have done harm. And now, with the wholesale destruction by disease, we could not suddenly check such importations. Let us, however, by all means see how we can counteract the very serious evils attending them. They are not likely to be counteracted by the rapidity of transit achieved on the Harwich route, and there is too much cause to fear that the promptitude with which animals are landed and trucked to London is quite incompatible with their most superficial examination with a view to prevent disease.

I do not wish to prevent our reaping the advantage of the rapid transit of stock; but it appears to me that we altogether neglect precautionary measures, which are essential for the preservation of the health of our own animals, when the foreign trade is acquiring great proportions, and can be carried on with increased facilities. We must watch narrowly unless small-pox in sheep should again reach us. The disease is spreading daily in Russia and Mecklenburg. I receive weekly reports, which prove that outbreaks of this disease are more numerous this year



than last ; and it is not unlikely that if we continue to neglect ordinary precautions, as we do at present, we shall soon have even more serious occasion to repent it than for the past. Let our markets rise a little more, and what is to prevent Russian cattle being shipped for our ports ? The few Podolian oxen I have seen from time to time in the London cattle-market have been fattened in Russia ; but the time seems to be fast approaching when enterprising traders will accelerate the travelling of stock from the markets in Eastern Europe, where it is purchased at a very trifling cost, and whence we may expect the transmission of plagues, which would nearly create a famine in these dominions. I am not dealing with imaginary evils when I have before my eyes, as I write this letter, a statement of the losses sustained by the Russian plague in the Austrian dominions. During the last fourteen years 500,000 animals have been seized with the disease, and of these 270,000 died. Even that loss is comparatively small when contrasted with the loss we have sustained during the last eighteen or twenty years through the lung-disease ; but if Russian cattle manage to reach our markets—and why should they not ?—we shall certainly have more than the Austrians, whose organisation for the prevention of disease among cattle is perhaps the best in Europe.

Prudent men must agree with me, that under existing circumstances we need something more than the rapid transmission of stock from foreign to British markets. We have already too much occasion to lament the introduction of foreign diseases into these islands, and we must watch lest we henceforward find that, whereas wheat barely remunerates the tiller of the soil for his labour, disease among live stock may irretrievably ruin him.—I am, Sir, your obedient servant,

JOHN GAMGEE,

Professor of Veterinary Medicine.

New Veterinary College,  
Edinburgh, Nov. 7

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(From *The Times* of November 13, 1863.)

SIR,—In my letter in “*The Times*” of to-day, “Russia” has been printed twice instead of “Prussia.” It is in the last named kingdom that the sheep-pox has been committing serious ravages for many years past, and perhaps never more so than during 1863. The Podolian—not “Portolian”—oxen have been fattened in Prussia, and not in Russia.

Many of your readers may not be aware that every Monday morning the London prices are telegraphed to Hamburg, Rotterdam, and other ports, whence the information is transmitted to such distant markets as those of Vienna and Berlin. If prices suit, cattle and other animals are trucked from these cities for London. The Austrian and Prussian stock is fattened to a great extent on the refuse of distilleries, sugar and starch factories, &c. Among the animals thus fed there are Polish and even Russian cattle. These animals have, however, passed a rigid quarantine on crossing into Austria and Prussia, and we have been protected from the Russian plague by the precautions taken in Central Europe to check its spread. A century since we suffered, and so did most countries in Europe. It was in consequence of the losses by this plague that veterinary colleges were first founded and liberally endowed abroad. In this country the most energetic measures were adopted to arrest the progress of the plague, and with the best effect. Our ports were closed to foreign cattle, and remained so till 1842, with some trifling exceptions in 1839-40. Over the whole country precautionary steps were taken to exterminate the disease, and in this our forefathers succeeded. How different now ! We do not prevent disease, but eat all our diseased cattle. Instead of veterinary surgeons being extensively employed to check the progress of maladies, the butcher’s services are in requisition when animals are seized with sickness. It is a common occurrence for a veterinarian to be asked, when visiting a case, if it be serious, and any decidedly unfavour-

able prognosis is sure to be followed by the animal being slaughtered, dressed, and despatched to London.

I could scarcely have hoped for so fortunate a coincidence as the publication of my letter in the same impression of "The Times" as the remarks of your Paris Correspondent on the importation of cattle and sheep from the Danubian provinces and from Roumelia into France. The project is abandoned, but why? Simply because there remain to be finished 750 miles of railway on one route, and 500 on another. When these railways are finished, or perhaps before then, there can be little to prevent the markets in the West of Europe from being placed in direct communication with the markets in the extreme East. Last century wars and revolutions led to the free transport of cattle in the rear of armies, and thus the Russian and other plagues broke out in all directions. Steam has proved a more certain means for encouraging the transmission of contagious disorders than war, and as yet we have not sufficiently considered its influence for evil in this respect. Your correspondent's observations are quite sufficient to show that I was not dreaming of impossibilities when sounding a note of warning in my letter of the 7th; but if we are receiving Spanish cattle in very fine condition by sea, what is to prevent a fast and suitably built steamer landing at a British port cattle shipped at Memel or Libau? Cattle are very cheap in Russia, and the Russians are turning their attention to the management of stock. If we do not husband our resources in the way of producing and fattening animals in the British Isles, we must depend more and more on the produce of Eastern, plague-breeding plains, and we may find ourselves at no distant period much worse off for animal food than we are at present, notwithstanding every facility being afforded for free-trade in stock.

Dearly-bought experience has demonstrated to the Austrians, Prussians, French, and others, that the importation of cattle requires constant supervision. Your own correspondents have this year furnished valuable information concerning the cattle plague as it spread through Turkey across the Adriatic and into the Roman States. The area over which this fearful malady has extended of late has been far wider than usual, and it has been found essential on many occasions to enforce a strict quarantine, and otherwise to interfere with the trade in cattle.

For the safety of British stock, and for the instruction of British stockowners in general, information concerning the health of animals in different countries should be published periodically, and it would be easy to devise a system of showing the diseased and the healthy regions of Europe in maps, which any cattle-dealer could consult. On such maps the course in which plagues spread, and perhaps even the extent and direction of the cattle traffic, could be indicated. In a short time such a mass of information would be collected as to show how we should act to encourage the trade in healthy animals, and effectually to guard against the traffic in diseased ones.—I am, Sir, your obedient servant,

JOHN GAMGEE,

Professor of Veterinary Medicine.

New Veterinary College,  
Edinburgh, Nov. 10.

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## COW-HOUSES IN LARGE CITIES.

(*From the Social Science Review, Nov. 7, 1863.*)

AFTER the many vague and unreliable tales about disease in the town dairies, it is satisfactory to have an unvarnished statement by a practical man, who knows precisely the extent and the nature of the evils to be combated in connection with the existing system for the supply of milk in large cities. We have heard much of miserable old cows, the dark dungeons in which they are kept, the bad food and filthy water they subsist on, the spare quantity of milk they yield, and the mashing up of brains to make up for the deficiency. All this, forming the basis of past exposures, we are told is absolutely false. The London cow-sheds



are, as a rule, clean and well ventilated ; the water-supply is good ; the food is wholesome ; and the cows are the finest that men can buy, paying, as the town dairymen do, prices varying from L.15 to L.30 for each animal, according to value. An average price is L.20. The cows are young, and often enter the sheds healthy ; very frequently they catch disease in the railway trucks and in the live stock market. Diseased animals are travelling in all directions ; they are everywhere freely bought and sold, and the result is that contagious diseases kill town dairy cows annually to the extent of twenty, thirty, and even fifty per cent.

In Professor Gamgee's lecture, which we published the week before last, one interesting subject is referred to, viz., the spread of contagious diseases amongst animals, when they are allowed to congregate in parks and commons. No doubt, in a similar manner, contagious diseases spread amongst human beings ; and however delightful it may be to enjoy fresh air, it is interesting to know that that enjoyment may with animals, as with men and children, be greatly marred by the spread of fatal disorders. Professor Gamgee distinctly tells us that the practice of turning cows out daily is attended with greater evils than the practice of tying them up in large cities, and owing to the prevalence of contagious affections, these animals are not tied up for more than four or five months. We know the advantages of stall-feeding in the country, and can well understand how cows yielding milk should benefit by quiet as well as regularity of keep. A breeding stock cannot be kept tied up. Accidents are common amongst cows shut up in stables and bred from. This, however, does not apply to stock only kept for yielding milk.

What we learned from Professor Gamgee amounted to this, that disease has prevailed to an extraordinary extent amongst cows in London since the date of the first importation of foreign stock. That no efforts have been made by veterinarians to organise a system of prevention. That prevention is comparatively an easy task, but that the efforts of medical officers of health have been made in a wrong direction, owing to the want of knowledge amongst these gentlemen of a subject which they felt themselves bound to interfere with, though concerning which they were ignorant. We have been told in distinct terms, that the milk of certain diseased animals is poisonous,—that all the diseased cows are eaten,—and the assembled dairymen, whilst admitting the existence of all these evils, declared that they have done their best, but they have not found professional men to assist them to remove any of the defects enforced in the system on which they are carrying on their trade. We must say that we found these men ready to learn, anxious to encourage any good scheme, if they could only be convinced of its value, and very determined to maintain their rights. We think that there now is some prospect of a better state of things, though we believe that no time was more opportune than the present for an official inquiry into the condition of the cow-houses in large cities.

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## IMPORTS OF FOREIGN STOCK.<sup>1</sup>

THE high quotations at which most kinds of stock have been disposed of during the whole of the present year have had the effect of stimulating shipments from the continent, and of increasing the exertions on the part of the Dutch and other graziers to forward even more liberal supplies in future. From the 1st of January to the 15th November, the arrivals of beasts, sheep, lambs, calves, and pigs into London amounted to 410,040 head, shipped from the following ports :—

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<sup>1</sup> This paper ought to have appeared as an original article, but arrived too late for that purpose.

## IMPORTS INTO LONDON.

	Beasts.	Sheep.	Lambs.	Calves.	Pigs.
Amsterdam, . . . . .	155	10,447	...	...	...
Antwerp, . . . . .	60	250	...	1,830	...
Boulogne, . . . . .	...	27	2	46	...
Bremen, . . . . .	4,073	2,955	24	...	...
Cadiz, . . . . .	...	3	...	...	...
Calais, . . . . .	...	25	...	281	117
Carril, . . . . .	279	...	...	...	...
Corunna, . . . . .	888	...	...	...	...
Cuxhaven, . . . . .	...	470	...	...	...
Dort, . . . . .	4,147	19,763	7,996	378	...
Dunkirk, . . . . .	6	...	...	...	...
Gluckstadt, . . . . .	13	...	...	...	...
Guernsey, . . . . .	4	...	...	...	...
Hamburg, . . . . .	2,474	81,982	...	29	8,011
Harlingen, . . . . .	13,893	34,597	1,516	2,754	9,762
Havre, . . . . .	32	...	...	8	...
Medemblik, . . . . .	790	22,621	...	30	...
Nieu Dieppe, . . . . .	131	3,446	...	162	...
Oporto, . . . . .	964	...	...	...	...
Ostend, . . . . .	508	248	70	626	...
Rotterdam, . . . . .	15,636	69,307	8,995	20,146	1,315
Sonning, . . . . .	21,931	26,020	6,275	4	...
Vigo, . . . . .	1,538	...	...	...	...
Total, . . . . .	67,502	272,161	24,878	26,294	19,205

Official returns give the aggregate arrivals into the United Kingdom in the first nine months at 366,471 head, against 225,151 in the corresponding period in 1862, and 227,715 in 1861. Thus, it will be seen, that the importations this year have increased considerably, notwithstanding the comparative scarcity of both beasts and sheep in Holland, and the unusually high currencies prevailing in that country. The largest number of beasts shipped from any one port is Toning. Rotterdam comes next in importance, and Harlingen figures for 13,873 head. Over 80,000 sheep have arrived from Hamburg, and nearly 70,000 from Rotterdam. Medemblik and Toning figure well. The arrivals from Spain have been on a very moderate scale; and we understand that they will continue small for some time, as the breeders, without the risk of casualties from a long sea voyage, find it more to their advantage to sell their stock to French jobbers. However, as regards the Dutch and German stock, it is evident that ours has become a most profitable market. Many of the sheep from Holland have realised 48s. to 56s., and even 60s. per head, or considerably over 5s. per stone; and those from Germany, *via* Hamburg, have sold at from 18s. to 33s. each. It must be admitted, however, that an extraordinary improvement has taken place in the general weight and condition of the sheep imported from Holland. We no longer see long legs and tails, inferior fleece, and an unshapely animal, but one equally as fat and saleable as most of our best breeds. The stock has been heavily crossed with our Downs, Half-breds, Shropshire, and, in some instances, with Kents and Leicester. Apparently the new system of breeding on the continent is paying remarkably well; consequently we may anticipate even a farther increase in the arrivals in 1864.

As regards the health of the foreign stock imported, a few remarks are necessary.

No doubt, a great amount of benefit has arisen from the observations we have felt it our duty to offer from time to time, in reference to the animals from abroad. In the first place, shippers abroad have shown more prudence in their shipments; and, in this country, the authorities have wisely exercised a



strict inspection of the cargoes as they arrive again. Very little stock has been purchased this year for the purpose of being fattened with English sheep in the neighbourhood of the metropolis ; consequently, disease has been arrested, and fewer losses have been sustained by our flockmasters and others. Extreme vigilance, however, is still necessary. We must not suppose that, because the stock, as regards its weight and quality, is reaching us in improved condition, the seeds of disease are likely to be wholly removed from us. Much has been accomplished to prevent losses. The grazing community have wisely refrained from purchasing foreign sheep in a lean state ; whilst, in reality, with the exception of the arrivals from Tanning and Hamburg, the numbers brought forward in a half-fat state have considerably fallen off. Here, perhaps, is one of our greatest safeguards ; and our impression is, that henceforth very few foreign sheep of an inferior character will reach us. Lean stock has, in our opinion, never adequately paid the foreigner ; but, when we consider the high quotations at which prime animals have been disposed of during the present year, we may safely assert that strict attention will henceforth be paid to quality, and, let us hope, to condition.

The outport arrivals have somewhat increased, and we understand that very large supplies are likely to be received on the east coast, in 1864. Much care, however, will be necessary to prevent contamination, by a careful inspection of the stock on arrival, because it is well known that, notwithstanding the improved condition in which both beasts and sheep have reached us during the last few months, a great amount of disease continues to exist on the continent generally. The arrivals of calves have been numerous, and of good quality. For the most part, they have "died" remarkably white in flesh, consequently, they have been purchased freely by the butchers. The pigs, however, have made their appearance in poor condition. Very few attempts have been made to improve their frames, and low prices have been realized for them.

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### PLEURO-PNEUMONIA IN AUSTRALIA.

A CORRESPONDENT writes from Denilquin, in a letter bearing date, September 21, 1863, that "Pleuro-pneumonia is raging here to a fearful extent. Inoculation (as performed here) seems to have but little effect. Horses are taking it. I opened one that died a few days ago, and its lungs were exactly in the same state as those of the diseased cattle. The papers here are full of complaints of the diseased meat, and some of the doctors say, that it is causing sickness among the people ; and children are ill by using the milk of cows that are diseased. I hate the sight of beef myself, as during a week I see a good many killed, and none of them but are more or less affected. I am *quite certain* that Inoculation, *properly* carried out, *is good*, but they want to be more particular in the 'lymph' that is used. In Australia everything is done in a hurry ; but I think before long they will have to be more particular, as government is taking measures to prevent the sale of diseased cattle for slaughter. The foot-and-mouth disease has never affected cattle here."

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### THE FOOT-AND-MOUTH DISEASE AMONG SHEEP.

(From the Scottish Farmer, November 23, 1863.)

FROM time to time our flocks have been reduced in value by attacks of this prevailing epizootic, which for some days prevents the animals masticating any food, and for a longer period impedes the sheep's movements. The most casual observer must have noticed, especially since All-Hallow Fair, in the fields around this city, that the sheep have been lying about in pain, feeding on their knees, and wasting in condition. Last year our attention was drawn to the state of

many flocks in East-Lothian altogether similar to the condition of those now affected, but the disease did not spread much beyond the farms where hoggs were purchased to feed on turnips. This year, unfortunately, some of our sheep-breeding districts, where fresh stock has been bought in, are suffering; and we can specially allude to some parts of Peeblesshire. Near Edinburgh we have had a number of flocks under our charge, and we have witnessed the best effects from a timely attention, so as to check the severity of the disease and to enable the animals to stand with tolerable ease on their sore feet.

In the first place, it is useless placing sheep thus affected on turnips which they cannot possibly gnaw. It is best to keep them where they can pick a little sweet grass, and if they can be made to take any soft food it will not do them harm, though for the first two or three days of the disease, as there is considerable pain and fever, low diet is not disadvantageous. Many of the animals are greatly benefited by a mild purge, or a dose or two of common nitre in water, or in a little food. Mild astringent lotions can be used for the mouth and feet, and, so far as the latter are concerned, the careful attention of the shepherd, and, when possible, of a veterinarian, is much required. We have to caution shepherds against paring too much. We have seen animals severely lamed and permanently injured by the tips of each toe being cut off, and, in some instances, we have seen sheep thus mangled bleed severely for twenty-four hours, weakening them much, and greatly retarding recovery. Proper paring of the feet is much required, but every care should be exercised, so as to leave an animal with a level bearing surface to touch the ground. In many instances the hoofs are thrown off—in some cases entirely, and in others partially. Sheep are found to be very lame where new hoofs are forming beneath old ones which are not properly cast, and it is a rule that when any considerable portion of horn is detached it must be cut away. If this is not done, earth and water accumulate in the recesses so as to soften and destroy the newly forming horn, and the foundation is thus laid for a peculiarly severe “foot-rot,” as the shepherds call it.

In paring the feet of sheep there is almost invariably much clumsiness manifested. The knives used are usually ill adapted for the purpose, and rarely sharp. The horn is cut into deeply, the toes are much shortened, and it sometimes takes three months before a sheep can walk and stand with comfort. On the hills, where the hoof is usually kept hard and worn, there is not much necessity for paring sheep's feet; but on lowland, and especially on damp pasture, the rugged edges of the horn overlap, the distortion of the foot is great, and the animal cannot implant it fairly on the ground.

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VIVISECTIONS.—At a recent meeting of the *Academie des Sciences* at Paris, an animated discussion took place on the above subject, consequent on the interference of the London Society for the Prevention of Cruelty, when the following resolution, proposed by M. Gooselin, and seconded by M. Bouley, was carried:—“The Academy declares unfounded the complaints laid before the Emperor by the London Society for the Prevention of Cruelty to Animals; asserts that these complaints are undeserving of notice, and that, as heretofore, the control of the vivisections, and the surgical operations performed in the veterinary schools, must be left to the wisdom and exclusive appreciation of men of science.”—*Scotsman*.

THE turning up of a horse-shoe, real iron, from a depth of seven metres in the deluvium of pre-Adamite deposit, bids fair to put out of joint the famous Abbeville jaw-bone. This phenomenon has been found on railway excavation in the Orne Valley, between Caen and Condé. The *Journal du Calvados* gives ample details, adding, that not only horse bones and sundry other antediluvian fauna, but skeletons of the Hudson's Bay beaver are plainly recognisable.—*Ibid*.



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